

2. Preamble

2.1 BACKGROUND

The growth of National Economy in a sustained manner is one of the foremost objectives of the National Planners. Last decade saw, a radical change in the overall outlook of the Planners, Administrators & Execution agencies, and a conscious shift from an inward looking approach, to that of an outward looking and all inclusive one. The focus shifted on development of Physical Infrastructure in the Nation and thus on Construction activities.

In view of uplifting the growth trend, a great stress is being put on streamlining the functioning of construction sector, and following key issues need to be articulated:-

- a) To define construction as an important economic sector.
- b) Establish and articulate the linkage of construction with other sectors of economy & its influence thereon.
- c) Identifying the impediments/bottlenecks restricting the capacity building within the sector and setting examples of the initiatives being taken by all stake holders to remove these.
- d) Identifying core issues to be addressed to reduce/eliminate the time and cost over runs being experienced in project execution.
- e) Identifying the need to establish dedicated Institutions to facilitate the capacity building of the Construction Industry, which has the credit of encompassing the Governmental concerns, Industry Constituents, Financial Institutions, Manufacturing Sector, Research & Academic Institutions and also host of other service providers.
- f) Suggest modifications in, & introduction of, latest & more efficient work practices and the regulatory frame work influencing the functioning of Construction Industry. Formulate business friendly policy, develop insurance instruments and aggressive marketing of Construction Industry internationally.
- g) Identifying the Human Resource needs to fulfill the tasks in hand and to evolve an overall National policy for Human Resource Development (HRD). Stipulate wide-spread use of trained labour as a prequalification condition in all procurement process of construction

work. Certain percentage of trained and tested workers must be employed which could be increased over time.

- h) Quality & Standardization and technology upgradation & cost reduction issues
- i) Issues related to Risk Mitigation, Disaster Management & Mitigation, procurement practices, and several others.
- j) Policy framework relating to asset management and maintenance.

It is well established that the ambit of this activity, encompasses many other sub-sectors of economy/Infrastructure development. These are:-

- i) Construction of Industrial and Mining Infrastructure.
- ii) Construction of Highways, Roads, Ports, Railways, Airports, etc.
- iii) Construction of Power systems.
- iv) Construction of Irrigation and Agriculture systems.
- v) Construction of telecommunication systems.
- vi) Construction of hospitals, schools, townships, offices, houses and other buildings.
- vii) Construction of urban infrastructure including water supply, sewerage, drainage, etc.
- viii) Construction of rural infrastructure
- ix) Other construction activities.

It is also well established that the Construction sector contributes copiously to-

- i) Generation of Employment
- ii) Provide sustenance to Manufacturing and Agriculture sector.
- iii) Creates substantial secondary impact for overall growth of the economy.

During the course of implementation of the 10th & 11th Plan, great emphasis was laid on construction of physical infrastructure. Some of the areas receiving special attention were:-

1. Transportation sector
2. Irrigation sector
3. Housing sector

4. Urban Utility sector
5. Civil Aviation

With the planned investments, apart from these areas, several others, shall also receive equal attention.

STRUCTURE OF CONSTRUCTION INDUSTRY

As the second largest economic activity, the influence of Industry spans across several sub-sectors of economy & the stature has multi-dimensional posture. The main characteristic feature of construction industry is a mix of organized and unorganized players in all sub sectors right from construction workers to Supervisors, Contractors and material manufactures / suppliers etc. To capture some of the salient characteristic features to enable better & deeper understanding, following matrix needs to be studied.

Matrix

1. Annual monetary Volume (2011) — Rs. 415,000 Crores

2. Average stratified employment quantum —

	Numbers (in 000s) in 2011	% age
Engineers	1050	2.56
Technicians & 1125 Foreman etc.		2.74
Clerical	930	2.26
Skilled workers	3727	9.10
Unskilled workers	34168	83.34
Total	31000	100.00

Source Census, CIDC Survey

3. Major upstream economic activities dependent on Construction Activities:

- Core Sector Industry (Cement, Steel, Coal, Energy etc.)
- Manufacturing (Industrial goods & products)
- Services (Engineering, personnel, HRD & Technology Transfer)

4. Downstream economic activities:

- Same as all above
- Social Infrastructure
- Welfare Infrastructure
- Agriculture
- Defence
- Transportation

5. Business Organization:

- Engaged in Direct construction
- Large Corporates
- Medium Size Companies
- Small Construction Firms (Unorganized)

Distribution of Contractors by Employment Size

2000	Enterprise	
	Number	% age
1-200 persons	29600	95.48
200-500 persons	1050	3.39
500 > persons	350	1.13
Total	31,000	100.00

6. Status of HRD:

- | | |
|--------------------------------|---------------|
| - Engineering / Graduate Level | - Organized |
| - Sub-Graduate Level | - Organized |
| - Supervisory | - Unorganized |
| - Workers/ Advisors | - Unorganized |

Specific initiatives are being taken by CIDC as explained in succeeding chapters.

7. Movement matrix in various sub sectors in construction Industry.

As defined in preceding classes, the service providers & the resources deployed in sub sector of construction Industry keep shifting, depending upon the demand generated/ projected in other sub sectors, since, irrespective of the operational nature of a particular sub sector, construction as an activity remains same & the services are provided by the service provider in more than one sub sector, following matrix displays the individual and overall inter sub sector movement of resources, during the 11th plan period.

It is to be noted that, the overall work scenario has remained almost same, with slight enhancement.

Relative Impact on Service Providers in Various Sectors

S No	Sector	Trends	Assessed Impact	Sectoral Weight	Net effect (Weighted Average)
1	Building / Residential / Institutional	↔	~	8.56	0
2	Roads	↑	+15%	14.28	+2.142
3	Bridges	↑	+15%	8.56	+1.284
4	Dam / Irrigation facilities / Hydropower Plants	↔	~	11.43	0
5	Power Plants / Gas / Thermal	↓	-10%	11.43	-1.143
6	Railways	↔	~	7.61	0
7	Mineral Plants	↓	-10%	6.67	-0.667
8	Medium Industry	↓	-15%	13.39	-2.009
9	Transmission Lines	↔	~	6.66	0
10	Urban Infrastructure	↑	+7%	6.66	+0.466
11	Maintenance	↔	~	4.75	0

Net impact + 0.73% ↑

Legends ↑ = +ve, ↓ = -ve, ↔ = Static

The purpose of detailing this analysis is to establish that.

- Construction Activities are common to the Infrastructure development in all sub sectors.
- The service providers & the inputs remain same irrespective of the sub sector.
- The construction activities, in various sub sectors, however, are governed by sub sector specific rules & regulations, creating the impediments in the growth.

Another important feature, which needs attention is the reliable information about construction labour force. A state wide survey may fill this gap.

8. Institutional Financing – Poor/ Very low

Details of initiatives and the outcome are explained in the succeeding chapters.

9. Safety – Indifferent approach in spite of several regularity stipulations as

Explained in relevant chapters.

10. Quality Aspects – Indifferent approach Initiatives taken & remedies

suggested in relevant chapters.

11. Database – Indifferent status, as a start up a Nation-wide MIS scheme recommended.
12. Best Practices – Faster absorbing capacity displayed by Construction Industry.
Suggestions / Models detailed in relevant chapters.
13. R & D Initiatives – Minimal, suggestion/models detailed in relevant chapters.
14. Adherence to labour laws – Minimal, suggestion/ models detailed in relevant chapters.

As can be seen from the above, the largest segment of Industry remains unorganized in spite of several ongoing initiatives to instill good practices. This has a profound effect on the overall performance and quality of delivery of the end product, since, the performance of even those in “Organized Sector” largely depends on those in Unorganized Sector”. This is due to the fact that Construction Industry follows onward contract practices for execution of works.

The solution, therefore, has to come through tackling following key impediments.

- a. **Extensive Human Resource Development at all levels.**
- b. **Adoption of good practices, both domestic and global.**
- c. **Revitalizing / strengthening the regulatory and legal frame work.**
- d. **Creation of Institutions empowered to insure adherence of the above.**

The succeeding chapters deal in detail, such models and recommendations to uplift the over all delivery.

Substantial National resources are being spent on building the assets and in the 12th Plan the pace of investment is going to enhance considerably where over Rs. 50 lakh crore is expected to be spent in development of Physical Infrastructure. It is envisaged that the deficits observed in agriculture sector would be bridged through contribution made by other sectors of economy and construction, indeed, shall play a key role. Looking at the present capability of delivery of Construction Industry, which is estimated at Rs. 4.10 lakh Crores per

year, based on the consumption of Cement and other important constituents, the Industry would need to enhance the deliveries substantially to meet the additional investment targets.

The key focus therefore, needs to be on building capabilities of the construction industry to deliver the desired results and to cope up with the envisaged work plans and deliver the infrastructure projects in time. Needless to mention that lack of this potential, would mean additional cost to the industry, adverse impact on economy, and environment, and substantial reduction in our competitive position, with respect to the International players. **The recommendations for implementation highlight the priority areas enabling the Construction Industry to achieve the desired growth rate during the 12th National Plan, through capacity building.**

It is worthwhile to mention, that on account of the above resolutions, and the joint initiatives taken by the Government, Construction Industry, and rest of the Stake Holders, reasonable work has been done on all the critical issues mentioned elsewhere in this Chapter which were also identified as an integral part of the development of The National Plan.

Few of the notable milestones achieved during the previous plan periods are:-

1. Accordance of the industrial concern status under IDBI Act, to Construction Industry
2. Implementation of national Human Resource Development (HRD) initiatives. in the non-formal sector, including the workers' level to the upper levels of engineering and management practices
3. Setting up of the Arbitral Institutions, for resolutions of the business disputes in construction industry.
4. Setting up of disaster identification and mitigation centres to act as the incubation places for development of a cadre of professionals, who are well trained to take necessary disaster prediction and mitigation initiatives.
5. Development of Institutions and implementation plan for safety and quality related issues obtaining state-of-art global technology through strategic association between the constituents of industry, Governmental organizations and international expertise.

6. Effective dissemination of information, regarding good work practices, and development of an action frame work for quality and safety audits, assessment and certification as well as training of man-power both for practice and research.
7. Improvement in procurement practices for the public sector, and also development of regulatory manuals to ensure quick and effective procurement procedures.
8. Setting up of models of public-private partnership initiation for stepping up the potentials and involvement of of construction industry encompassing Government, Industry, and other stake-holders in the building of physical infrastructure.
9. To develop economic parameters for making an efficient assessment of variation of the price lines, keeping in view the global influences on vital services and manufactured goods being consumed by the Construction Industry.
10. To develop interactive and strategic associations among National & Global players, and facilitating access to new technologies, standards, and services, for efficient execution of the projects both within and outside the country. Also to utilize such associations to avail of the market share in overseas market.
11. To facilitate development of consultancy and advisory services in the areas of project and construction management, procurement services, regulatory issues, & technology
12. and several more

A sure manifestation of such initiative could be guaged from the fact that the time and cost over-run in execution of projects have dropped considerably from 167 % average to 64%. **(source: Ministry of Statistics and Program Implementation).**

Construction activities are considered as integral part of a country's industry, economy, employment and quality of life, which goes beyond, mere development of physical infrastructure development plans, therefore, the need to focus on this important issue and therefore ;these initiatives.

2.2 PAST STUDIES

Several studies have been carried out in past, and the references have been made in the report for the 10th & 11th National Plan. However, to recapitulate following is the sequence of incidences of various study groups who deliberated and contributed in past on the issues:

Phase I

1. High level building projects team (BPT) set up in 1957 by Committee on plan projects.
2. Technical Panel was set up in 1968 to formulate guidelines for achieving economy in construction costs
3. Formation of a Construction Economics Division in Planning Commission
4. Several other bodies like National Building Organization (NBO) Central Building Research Institute (CBRI), Building Materials and Technology Promotion Council (BMTPC) were formed.
5. Planning Commission set up a working group on improvement of methodology and technology of construction
6. Organized national conference on construction

Phase II

Formation of a Construction Industry Development Council, as the apex body in the year 1996, to promote all aspects of construction, formed jointly by the Planning Commission, and the Construction Industry together with several Union and State Level Ministries/Public Sector Undertakings/Financial Institutions, etc. who have substantial interest in construction activities.

It is noteworthy to mention that during Phase I the approach has been to establish the preeminent position of the construction industry, and to conceptualize development of an Institution through collective consensus.

Phase II i.e. post 1996 was the implementation phase where the Construction Industry Development Council (CIDC) started implementing several project proposals, which were mooted from time to time, as an outcome of the deliberations of various Study Groups/Project Teams and Working Groups defined above.

As we have noted during the 10th Plan a substantial ground work was executed which resulted in a substantial reduction of time and cost over-run in project execution, and also formation of several Institutions to build the capabilities of the industry.

In order to sustain the momentum, and to further escalate the same, it was envisaged to have an even more detailed dissertation leading to development of 11th National Plan, for which a Working Group on Construction has been constituted by the Planning Commission to prepare a Report on Construction for inclusion in the plan document. The constitution of the Working Group, and the term of reference of working, are detailed in the **Anexure 1** to this report.

In order to develop these inputs a two prong strategy was followed, to obtain the widest participation in the working group, to enable the working group to cover a wide spectrum of issues. Apart from the main working group, which was kept fairly wide, and included known experts drawn from all the segments of the Construction Industry, representatives of Stake Holders, several important Ministries, PSUs, SPVs, Financial Institutions, many other Government Agencies, both at the Central and State Government level, and the industry constituents, were advised to constitute subject and theme specific sub-groups who could deliberate on the relevant topics, in consonance with the terms of reference, of the main working group, and provide the outcome of all their deliberations to the main working group for further deliberation, and eventual inclusion the report. A list ;of such sub-groups is enclosed as **Annexure** to this report.

As the second, but contiguous initiative, to intensify this initiative further, the working group proposed to conduct a series of theme specific workshops/seminars where the experts representing the theme specific were invited to provide their valuable contribution towards making of the report. A list of such workshops is enclosed as **Annexure** to this report.

2.3 STRUCTURE OF THE CHAPTER

The Chapter on Construction has 7 major sections each articulating the summary of the deliberations and the recommendations made by respective working groups, the summary chapter on recommendations, and the details of the proposed implementation plan.

The targeted work load, if to be executed during 12th Plan period, would need delivery potentials of Construction Industry to rise by 100 % at least.

A gross estimate of the requirements of resources is given below :

**Additional REQUIREMENT OF RESOURCES FOR EXECUTION
OF PLANED INFRASTRUCTURE CONSTRUCTION**

a)	Total Investment/ Year	:	Rs.10,00,000 Crores
b)	Moderating Factor	:	62 % (weighted average factor of construction activity), in Infrastructure development.
c)	Effective Additional Investment in Construction	:	Rs. 210,000 Crores
d)	Monetary Requirements	:	
	- For Construction Materials	:	Rs. 110,000 crores
	- For Construction Equipment	:	Rs. 45,000 crores
	- Manpower	:	Rs. 25,200 crores
e)	Detailed Requirements(Addl/ a---		
(i)	Materials (Major)	:	
	- Cement	:	105 Million tones
	- Steel	:	45 million tones
(ii)	Manpower	:	25 million man years
	- Engineers	0.9 million man years :	
	- Technicians	1.10 million man years :	
	- Support Staff	0.98 million man years	
	- Skilled Workers	6.25 million man years	
	- Unskilled/ Semi skilled workers	15.12 million man years	

Source : CIDC Estimates

These resources would be required over next 5 years on year to year basis.

It is, therefore essential, that necessary measures be taken to prepare the Industry to meet this challenge. Following clauses define the analysis for assessing the parameters leading to present day performance of the Industry, in the context of overall National Economic indices/parameters.

(1st Draft 5/3/2012)

EXECUTIVE SUMMARY

In the context of development of the Chapter on Construction in the 12th Plan document, the Planning Commission constituted a Steering Committee vide their order dated 4th August, 2011. Dr. Arun Maira, Hon'ble Member (Industry), Planning Commission was nominated as the Chairman of the Steering Committee, which comprised of Senior representatives of various Ministries of Government of India, Public Sector Undertakings, Construction Companies, Industry Associations and, Individual Experts from Construction Industry. The Steering Committee was convened by Dr. P R Swarup, Director General, Construction Industry Development Council, supported by several Senior Experts drawn from Construction, Legal, Technical & other sub-sectors. **Dr. Manoj Singh, Advisor (Tpt), provided integral support by organizing the meetings of the steering committee, articulating and explaining the approach & also moderating the deliberations.**

The introduction of Chapter on Construction in the National Plan was done in the 10th Plan (2002-2007), and recognizing the importance of construction, as a major economic entity, it was decided to amplify the deliberations during the 11th Plan as well. The 12th Plan document further amplifies the actions to be taken & also recommends actionable points. It is also envisages that, post plan document finalization a Steering Committee shall be constituted to oversee the implementation of the recommended actions made by the plan document drafting Steering Committee. The proposed terms of reference, have also been detailed in the subsequent chapters.

India has been experiencing unprecedented economic growth. During the 10th & 11th Plan periods, substantial contribution to the National Economy has come from the Construction Sector, however with the slowing down of global economies, even the Indian economy is facing certain challenges. Maintaining the pace of growth experienced during last one decade, probably is a major issue, and this amplifies the need of bringing in further reforms and streamlining the functioning of construction industry.

Whereas, some of the policy statements recommended in the Chapters of Constructions in 10th & 11th Plan have been initiated for implementation, much needs to be done. The government has put in place policies, which have generated over **8 % growth** on an average for the past few years. The plans are on anvil to achieve **9-10 % annual growth rate in the next 5 years.** This would be the basis for

generating the resources needed for the massive investments to be made in development of Physical Infrastructure & also the policy frame work to be modified, developed & adopted.

The 12th Plan envisages a growth rate of over 8% per annum, and would need infusion of substantial capital, estimated at over Rs. 50.0 lakh crores to build India's physical Infrastructure. The development of physical infrastructure, through such massive investments would need commensurate growth in delivery potentials of Construction Industry which in turn necessitates evolution of reformed practices & establishment of Institutions.

It is note worthy to mention that the present capacity of asset building of the Indian Construction Industry is estimated at Rs. 4.15 lakh crores per annum. In order to accomplish the task in hand (to build assets valuing Rs. 50 Lakh Crores), the sector has to double the capacity. The human as well as the material inputs need substantial stepping up & therefore the plans & policies too, would need rank upgradation & modifications.

Impediments therefore need to be removed and necessary facilitation need to be taken. The objectives and the approach of this Steering Committee are given below:

I. OBJECTIVES

1. To study & analyze the Indian Construction Industry, keeping in view the focus on creation of a world class infrastructure and rebuilding rural India through schemes such as Bharat Nirman & Schemes under MNREGA. To make an assessment of qualitative and quantitative capabilities of the Indian Construction Industry in the background of category-wise projections for construction and allied supporting activities in the 12th Plan with a view to evolve strategies for overcoming deficiencies and bottlenecks and achieve time bound targets, by suggesting measures for better coordination among the stakeholders..
2. To review the regulatory framework governing the sector including fiscal & other regulations and suggest any changes required to make the sector more efficient & productive.
3. To review the present procedures of Government procurement including dispute resolution mechanisms for construction work and evolve measures for improvement, especially in view of increase in privatization in the infrastructure sector.
4. To review the present system for execution, supervision of progress and quality, release of funds, certification, billing and payment for work and suggest remedial measures for minimizing time and cost over-runs in projects undertaken by or on behalf of Government.

5. To review the State of present financing models for construction work; institutional financing from Banks/ Financial Institutions and their lending norms, and recommend measures to enable access to finance at globally competitive rates.
6. To focus on R&D activities in the construction sector and suggest measures for greater use of modern technologies and equipment and speedy adaptation of new methods..
7. To evaluate role of Construction Sector in generating employment, keeping in view the qualitative & quantitative changes which have occurred in the recent past and to suggest measures for qualitative upgradation and more remunerative employment in the construction industry.
8. To assess the demand of manpower, category-wise and suggest remedial measures, including skill development, to face shortages, and suggest improvements in the functioning of National Skill Development Mission.
9. To review the quality and safety aspects in construction and to suggest necessary measures, and to recommend measures for evolving a Techno-legal regime.
10. To review the status of asset management and evolve strategies for implementation at local/State/Central Government level.
11. To study the impact of this industry on environment and suggest measures to make it more environmental friendly and sustainable; to also review the present regulatory framework for environmental clearance with a view to making it more business friendly.
12. To review the status of data base in the construction sector and to suggest ways and means to upgrade, augment and effectively maintain the same on institutional basis.
13. To study the best practices adopted worldwide and draw lessons for the Indian Construction Industry.
14. To suggest a policy framework for the increasing productivity and reducing construction costs, in order to ensure the healthy development of the construction sector after examining/ reviewing of the above mentioned areas and the existing regulating framework .
15. To recommend the measures for self-regulation for the constituents of the Construction Industry.
16. To evolve suitable mechanisms to ensure implementation of the recommendations of this Group during the twelfth plan period.
17. To examine any other matter considered important by the Steering Committee.

II APPROACH

It is note worthy to mention, that the present day Government having recognized the need to develop and improve the overall physical infrastructure, is actively taking appropriate measures to improve the

functioning of Construction Industry. Growth and development of the physical infrastructure is directly related to the growth of the development of National Economy. Construction is inherent to infrastructure development, and the objectives defined above were intensively deliberated by the Steering Committee and six associated Working Groups were constituted, to work on specific areas such as:-

- 1. Regulatory Framework including self regulation & issues leading to time & cost over runs.**
- 2. Procurement systems & dispute resolution system.**
- 3. Human Resource Development.**
- 4. Institutional financing.**
- 5. Quality standards & Environment Issue.**
- 6. Research & Development.**

The Chapter on Construction, therefore has been structured to encompass the issues, impediments, their solution & good practices, which could be emulated with respect to above defined key areas, Another section has been included, articulating the actionable points & identifying stake holders.

Keeping in view the continued thrust in several sub-sectors of the physical infrastructure such as, Transportation, Irrigation, Housing, Urban Utility, Civil Aviation, Agriculture, Power Generation, Water Conservation & Management and Power & Energy, the Steering Committee evolved major recommendations, which need to be instilled in the National Plan.

The approach of the Working Groups was focused towards the capacity building of Construction Industry, both in terms of quality and quantity to handle the substantial work load, that is confronting the Construction Industry. The major issues of challenge , therefore, were identified are:-

Overall Vision

With the slated investment of over US \$ 1 Trillion or Rs. 50 Lakh crores to build the Physical Infrastructure in the Nation, thereby raising the quality of life of citizens, giving a boost to the National Economy, & generating employment, the construction sector would play a major role during the 12th Plan.

Effective management of the sector & mitigation of the bottlenecks & impediments, both in the regulatory systems and also in the working dynamics of the sector shall be essential to achieve the targets.

This would involve Institution building, systemic improvements to be instilled & creating a holistic approach to bring in required reforms to convert the rule bound & rigid structure administering the sector, to a more meaningful, vibrant & efficiently run entity.

The reforms to be brought in need to be sustainable & must spring from within as well.

Since the sector covers a wide variety of economic activities including construction of houses & buildings, Transport structures, energy systems, Petrochemicals, Industry & several more, the issues affecting the performance to this sector are both generic, and specific to the respective sub sectors.

With an average annual value of asset creation being Rs. 415,000 Crores and an employment of over 41 Million citizens the sector has many complexities, needing resolution & therefore the approach to meet the planned growth should be to handle the generic issues, which need to be looked into very urgently.

It is noteworthy to mention, that with the present capacity, as defined above the targets laid down may fall short by 45%. It is therefore necessary to critically examine following areas & do the stock taking.

- **Human Resource Development**

The key to the sustainable & robust growth of any sector in the National Economy is the Human Resource. With over 41 Million citizens under direct employment of construction entities, the sector has the distinction of being the second largest employer.

A miniscule proportion (5.65%) of this strength has the benefit of structured training & education, keeping the activity under low value/ low productivity tag.

The thrust, therefore needs to be given on creation of Institutions & Institutional frame work along with provision of Institutional resources to meet the requirements of HRD.

Training, Skill up gradation, & certification of skills need to be taken up vigorously, where the Government & Industry have to join hands. The resources to meet the monetary requirements could be channeled through welfare cess & PF deposits as well as from the training funds earmarked under various state & centrally sponsored schemes.

While developing the Institutions & creating infrastructure for the Human Resource Development, some novel actions could be taken, such as

- a) Declaring Construction sites as places of learning.**
- b) Introducing mandatory internship for engineers, post or during their education.**

Mere provision of financial resources may not attain the purpose if the training infrastructure is lacking, & therefore training programmes to groom the trainers & Institutional provisions need to be placed in position.

Even a fresh crop of contractor would need formal training to meet the demands.

- **Regulatory Frame Work**

The regulatory framework governing the construction sector definitely needs toning up in the 12th Plan period.

Enacting a unified set of provisions leading to enactment of a construction law would be a major necessity.

Another important aspect is to harmonize the central & state level legislations to create an improved & hassle free operating climate for construction entities.

With the size & diversity of operations in the sector, a fair amount of self regulation would also be needed to be practiced. Systemic structure, therefore would be evolve to enable the Industry to exercise self regulation, in several areas.

The 12th Plan shall recommend such measures and also the formation and empowerment of Institutions to facilitate ingress of this measure.

- **Procurement Practices**

For effective & transparent performance of the service providers, the toning up of the Procurement Systems, prevalent in the Nation, shall be another thrust area in the 12th Plan.

Following steps would be taken.

- Adoption & periodic up gradation of standard contracting conditions.
- Adoption & periodic up gradation of works manuals

The focus shall be on introducing the harmonized, equitable & transparent provisions to arrest & eliminate the time & cost over runs in the project execution.

- **Dispute Resolution**

Another irritant in effective project & contract execution is the delayed & amorphous dispute resolution systems being practiced.

With over Rs. 135,000 Crores investments held up in the contractual disputes & an overage period of resolution being 15 years, the dispute resolution mechanism in the country are a major contributor to the time & cost overruns of the project & a retarder to the progress.

The focus of the 12th Plan would be to insure implementation of following.

- i. Institutional mode of Dispute Resolution in place of Ad-hoc mode.
- ii. Implementation of the Indian Arbitration & conciliation Act 1996.

During the 12th Plan another vital action would be to educate the stake holders in these aspects.

- **Quality & Standards**

Construction being a capital intensive venture, the stress on quality of the built products would be another prime objective of the 12th Plan.

Construction Methodologies, products, and the eventual delivery would be benchmarked to become comparable to the International Standards. Another important area of action during the 12th Plan shall be to empower the standard Institutions.

To accomplish the task, Institutions shall be established & existing Institutions would be empowered and their functioning be harmonized.

- **Environment**

Construction activities are known to be the biggest energy consumers & have a profound impact on the environment.

Starting from mining of natural resources to building the end product, substantial pollution is created.

The thrust of the 12th Plan would also be on

- Adhering to the Environmental Protection laws by construction Industry in a manner that the progress is not retarded.
- Making “Green Construction” a major thrust area.

- **Research & Development**

Ingress & Introduction of new & smart technologies to reduce the costs & time for execution of the Projects, shall be another thrust area during the 12th Plan.

Presently little investment is made in primary R&D initiatives, specially when compared with the volume of work done annually.

During the 12th Plan period the thrust areas shall be.

- i. Focus of Innovations.
- ii. Strengthening the R&D Institutions & facilitating establishment of new Institutes.
- iii. Incentivizing the R&D & Innovating initiatives.

- **Mechanization of Work Practices.**

The functioning of construction sector is primarily manual leading to low value addition, poor quality of products, and also longer time for completion.

Mechanization of operations, though gaining popularity, yet needs larger thrust. This would be another area of attention during the 12th Plan period.

Plan period would see

- Establishment of Equipment Banks.
- Better fiscal concessions for manufacturers of construction equipment, thereby reducing costs.
- Availability of trained operating & maintenance personnel.

- **Project Exports**

Construction Industry in India is generally an in bound Industry, with a very small contribution to the National Economy through Project exports.

At present only 1.85% of the total output comes from projects & need substantial rise.

During the 12th Plan period, Project export shall be another thrust area & following actions be taken.

- Generating more business for Indian construction companies through G to G interactions & bilateral treaties.
- Provision of better fiscal incentives to the project exporters both for business development & execution initiatives.

- **Institutional Financing**

Institutional Financing is the key to smooth & efficient implementation of construction projects & following shall be the thrust initiatives during the 12th Plan.

- Raising the share of Institutional lending from 1.5% to at least 5% and more to improve the liquidity of service Providers.
- Encouraging Institutions to resort to innovative products to meet the equity & debt provisions for PPP projects.

- Creating & adopting Insurance & non Insurance risk assessment & mitigation products
- Provision of working capitals for start up ventures & entrepreneurs in construction Industry.
- Establishing a nodal construction Development Bank to meet all such needs.

Establishing Institutions, nodal bodies, & facilitating Interaction among all stake holders.

Construction activities are undertaken by several Ministers, PSUs & also the developers from the corporate sector.

The most important action, to be taken during the 12th Plan period, shall be to ensure a seamless coordination among all the Project execution & Project owning agencies.

Needless to mention empowered commissions, regulators and such Organs would be established to ensure implementation of the Plans thus laid down.

III RECOMMENDATIONS

The development of recommendations took in cognizance the issues listed above, needing address and encompassed existing impediments/limitations and relevant mitigation measures, having recognized that, the Construction Industry has a great contribution potential to the overall National Economy, having displayed consistent growth trend of around 8% during last plan period. These include the macro recommendations, which require policy intervention at Central and State Governments level, action by stakeholders, and certain implementation models at gross root level, which may be elicited as examples for detailing a blue print for action.

- i) Review of present procedures of procurement of projects & services including dispute resolution mechanisms, and quality issues and evolve measures for improvement, particularly in view of the increasing privatization in infrastructure sector. The Steering Committee recommends following:-
 - a. The Contract Conditions being used by various Project Authorities in the Country, **whether in Public or Private Sector**, should be harmonized. The recommendations issued by the **Ministry of Statistics and Programme Implementation in this regard, must be implemented fully** by all Project Owners in the Country. This

would require Government's intervention to convert guidelines of MOSPI into specific directions for all Public Agencies/ Undertakings/Organizations. [The recommended guidelines on contract conditions & also the model works manual are hosted on the web site \[www.cidc.in\]\(http://www.cidc.in\).](#)

- b. For the Public Private Partnership models, the Model Concession Agreement developed by the Planning Commission for the Road & Highway Sector, could be used as a base model and modifications could be made to cater to other sub-sectors, as well.
- c. Necessary provisions in the procurement system, be made to ensure that standard quality certification (third party) systems are adhered to.

Some system giving incentives for timely completion and good performance by concerned construction agencies be suitably introduced. A system may also be developed and promoted to facilitate small and medium construction companies to share services and available plants and machinery at equipment banks. [In fact similar systems have already been introduced in several highway construction projects of Maharashtra State Road Development Corporation.](#)

- d. The emphasis must be laid on Institutional Arbitration system, instead of Ad-hoc system, as is being followed presently. The arbitration should be in line with Indian Arbitration and Conciliation Act 1996.
 - e. To minimize "disputes" leading to time and cost overruns proper project planning process should be encouraged and DPRs may be completed before technical sanction.
 - f. Suitable institutional modifications be introduced for risk mitigations. New insurance products should be developed.
- ii) A National Plan for **training and certification of Construction personnel** at all levels should be developed and implemented.
- The plan should include initiating a system of 'Graded Certification' depending upon levels of proficiency achieved. To meet shortage of available trained manpower in certain

urgently needed trades short terms courses may be introduced where ITI courses are of long duration.

It is further recommended that some kind of Permanent Identification number be granted to the workers, and a nation wide scheme of granting e-cards be launched for effective availability of the benefits.

The construction sites could be designated as the learning centers & introduction of mandatory Internship for the students of engineering programs both at Diploma and Degree level be made.

- iii) Well defined and harmonized institutional financing systems be evolved to build the capacity of Construction Industry.
- iv) A comprehensive Draft **Construction Law** should be developed and **the Construction Law for India** be enacted through wider consultations.
- v) Present system of **asset management should be reviewed** at local/ state/ central government levels and strengthened. A policy frame work **ensuring mandatory provision for maintenance of assets supported by adequate budgetary allocations and trained manpower be set-up.**
- vi) A National strategy and policy framework focused particularly on **productivity enhancement** and **cost reduction** be developed to match with envisaged work load and delivery targets of various sectors and for sustainable development and growth of construction industry.

Induction of new technologies, construction systems and energy efficient materials (preferably based on waste recycling) should be adequately emphasized in the development of national strategy for enhancing productivity and efficiency and reducing cost of construction works. For rural roads sector, there appears to be strong need for developing and introducing use of “marginal materials” to enhance cost effectiveness of works.

It is therefore proposed, that a National Construction Research & Development fund be created & an authority be constituted under the auspices of a nodal ministry to administer this provision. **As an initial seed support a sum of Rs. 100 crores be allocated to pursue these objectives**

- vii) An appropriate **Management Information System** should be developed and implemented at National, Provincial and Local levels for construction industry. An Institution be

nominated as the repository of National Data Base for Construction Industry.

- viii) Systems & Institutions should be developed for **expansion of network for project export and attracting more foreign investment**. Interactions with Indian Missions abroad , should be intensified, through evolution of an Institutional mechanism.
- ix) A mechanism for **registration of professional engineers** need to be established for which a **nodal agency need to be identified**. Intake in academic institutions be regulated to mitigate declining trend in the availability of civil engineers
- x) **Taxation & Regulatory Systems should be revamped**. Sectoral classification and definition of Construction Industry should be established, as for taxation purposes construction “is treated as “Industry” as well as “Service” The Steering Committee recommends that construction be treated as Industry and the existing definitional anomalies, where for certain sub-sectors of construction sector, service taxes have been introduced, be removed.
- xi) **Institutional Arrangements be made to identify, prevent and mitigate the effects of Natural Disasters**. New programs should be taken as per guidelines and programs announced by National Disaster Management Authority. The Steering Committee recommends that following actions should be taken up on priority.
 - g. To develop the Human Resources in Disaster Mitigation and disaster resistant construction technologies and
 - h. Retrofitting Clinics and Disaster Identification Centres be set up in all major settlements and districts falling in disaster prone regions
- xii) An Institutional mechanism need to be developed for continuous evaluation of various economic parameters such as Construction Cost Indices and impact of policies of other sectors having impact on cost of construction works.
- xiii) A National Plan need to be developed for upgrading the prowesses of Engineering Consultants and advisors, and should be implemented.
- xiv) Adherence of standards should be ensured through relevant regulatory provisions.
- xv) A national plan to be evolved and implemented for entrepreneur development in Construction Industry for raising the capability levels.

- xvi) A conceptual plan to identify a nodal organization to implement and monitor above should be formalized and implemented upon.
- xvii) A national plan for insuring adherence to the Environment Protection Act (2006) be developed and Energy Efficiency issues be addressed in conformity to the Energy Conservation Act of 2001.

Chapter 3.0

REGULATORY FRAMEWORK, INCLUDING SELF REGULATION & ISSUES LEADING TO TIME & COST OVER RUNS IN THE PROJECTS FOR CONSTRUCTION SECTOR

3.1.0 Preamble:

Having recognized the importance of construction sector in growth of the National Economy, the chapter deliberates on the state of the Regulatory frame work governing the functioning of this sector.

Following are the major observations.

- i. There is no unified regulatory frame work, thereby creating a state of confused working.
- ii. The decision making by the project owners (Primarily in public sector) is highly impeded, resulting in slow progress of work, disputes, and infructuous expenditure.
- iii. There is no singular regulatory authority to administer the functioning of the construction Industry.
- iv. The good practices related to self regulation are seldom observed. The succeeding clauses deal with the steps to be taken to streamline the functioning of Industry.

3.1.1 Need of a Unified Construction law.

As per prevailing laws, an organization engaged ;in construction activity requires registration under five different legislations and is subject to inspection by officers appointed under twelve enacted laws having prosecution powers. Further, they are required to obtain licenses under three enactments. It is pertinent to note that all the applicable legislation requires periodic returns and dealing with the notices issued by different authorities. The details of various statutes only pertaining to labour to be followed are given below:

LIST OF LABOUR LAWS APPLICABLE TO THE CONSTRUCTION INDUSTRY IN INDIA

1.	Children (Pledging of Labour) Act, 1938
2.	Employment of Children Act, 1938
3.	Factories Act, 1948
4.	Mines Act, 1952
5.	Employment Exchange (Compulsory Notification of Vacancies) Act, 1959
6.	Industrial Employment (Standing Orders) Act, 1946
7.	Industrial Disputes Act, 1947

8.	Workmen's Compensation Act, 1923
9.	Indian Trade Unions Act, 1926
10.	Employer's Liability Act, 1938
11.	Employer's Sate Insurance Act, 1948
12.	Employees Provident Funds Act, 1952
13.	Maternity Benefits Acts, 1961
14.	Payment of Wages Act, 1936
15.	Motor Transport Workers, Act, 1951
16.	Contract Labour (Regulation and Abolition) Act, 1970
17.	Payment of Gratuity Act, 1972
18.	Apprentices Act, 1961
19.	Equal Remuneration Act, 1976
20.	Minimum Wages Act, 1948
21.	Payment of Bonus Act, 1965
22.	Weekly Holidays Act, 1942
23.	Collection of Statistics Act, 1953
24.	The Inter-State Migrant Labour (Regulation of Employment and Conditions of Service) Act, 1973
25.	The Building and Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
26.	The Building and other Construction Workers Welfare Cess Act, 1996
27.	The Employees Provident Fund and Misc. Provisions (Amendment) Act, 1996.

Recognising the problems of long felt need for a single window type of arrangement and dealing with multiple laws, and authorities, by construction entities the Construction Industry has mooted the idea of formulating a unified law for the construction industry to enable formation of a one authority which can oversee compliance of various requirements by construction companies. The detailed structure has been proposed in the succeeding clauses. This Authority, like the National Disaster Management Authority should be chaired by the Hon'ble Prime Minister of India & should have an autonomous structure.

It is proposed that the construction law be divided ;into the following chapters;

1. **Preliminary**

Title, extent, commencement, definitions, provisions, and power to exempt during public emergency.

2. **National Construction Policy & Plan**

National policy, plan; inter-state, regional and inter-regional construction; provisions with respect to construction company; standards of performance, of registered companies and licensed contractors; standards; information with respect to levels of performance, market dominations; rate regulations; development of market.

3. **Central Construction Authority Constitution and Functions**

1. Constitution, etc of Central Construction Authority,
2. Members not to have certain interests
3. Officers and staff of authority
4. Functions and duties of authority
5. Power to require statistics and returns
6. Directions by Central Government to Authority
7. Central Advisory Committee, (CAC)
8. Objects of CAC

4. **Constitution, Powers and Functions of State Authority**

9. Constitution of State Authority
10. Qualifications for appointment of chairperson and members
11. Constitution of selection committee to select members
12. Functions of State Authority
13. State Advisory Committee (SAC)
14. Objects of SAC
15. Terms of office and conditions of service of members
16. Removals of members
17. Vacancies, etc. not to invalidate authority
18. Power of appropriate authority
19. Proceedings before authority
20. Powers of entry and seizure
21. Delegation

5. Grants, Funds, Accounts, Audit and Report

- 22. Grants and loans by Central Governemnt
- 23. Establishment of fund by Central Government
- 24. Accounts ;and Audit of Central Authority
- 25. Annual report of Central Authority
- 26. Grants and loans by state Government to state authority
- 27. Establishment of fund by State Government
- 28. Accounts and audit of state authority
- 29. Annual report of state authority
- 30. Budget of appropriate auithority
- 31. Directions by state Government

6 Dispute Resolution, Arbitration Arising out of Contract

32. Arbitration

7 Other Provisions

- 33. Responsibility of employers & Labour Laws
- 34. Responsibility for payment of wages and compensation
- 35. Notice of accidents ;and enquiries
- 36. Appointment of Chief Construction Inspector and Construction Inspector
- 37. Co-ordination Forum
- 38. Exemption of Construction Equipment and Machinery from Attachment in Certain Cases
- 39. Protection of action taken in good faith
- 40. Recovery of Penalty payable under this act
- 41. Service of notices, orders or documents
- 42. Provisions of this act to be in addition to and not in lderogation of other laws
- 43. Powers of Central Government to make rules
- 44. Powers of central authority to make regulations
- 45. Rules and regulations to be laid before parliament
- 46. Powers of state government to make rules
- 47. Powers of state authority to make regulations
- 48. Rules and regulations to be laid before state legislature
- 49. Powers to remove difficulties

50. Provisions of Act not to apply in certain cases.

8. **Authorities and Registration**

51. Appointment of Registering Authorities and licensing officers

52. Licensing of contractors

53. Revocation, suspension and amendment of registration and licences

54. Certificate of registration or grant of licenses

9. **Miscellaneous**

55. Offences by companies

56. Cognizance of offence ;under this act

57. Members, officers, etc. of appropriate commission to be public servants.

3.2.0 **Decision Making**

Construction is an area which not only involves high cost in implementation of projects but depends on multi-disciplinary team of professionals, administrators, finance and accounts personnel, from owner's side (which in most cases is Government) and contractors, suppliers, consultants etc. both from public and private sectors. Decision making, is a complicated process which is another area of critical importance in planning, design and execution of construction works.

Since cost implications of construction projects are generally huge and mostly pertain to spending of funds from public exchequer, Government through, their vigilance administration, has always been concerned with the issue of evolving and implementing guidelines for the procedures, methods, to be followed at different stages of planning, project formulation, tendering, decision making and implementation including acceptance of completed works etc., in order to ensure that at every stage, duties and functions are performed by concerned officials and subordinate functionaries in a manner which does not give rise to wrongful practices of favoritism and spending leading to corruption or wastage of government funds.

Inspite of the good intentions, the process of conducting such surveillance, causes impediments in project execution.

This needs to be toned to instill confidence in executives implementing the projects. This can be done, through deputation of knowledgeable officers charged with the responsibility of Surveillance, and also through detailing and implementing a manual where the Code of Conduct is laid down. Such manual should be prepared taking in cognizance the views of project authorities and CVC inter-alia.

An works/ contract manual, has been prepared by the Ministry of statistics & Programme Implementation, with the assistance of CIDC. This works manual could further be modified taking in the cognizance of the views of CVC & be used for all public funded projects by different Project Authorities

3.2.0 Impediments faced by the Industry

- CONSTRUCTION has been declared as an INDUSTRY: but has presently NO REGULATORY FRAME WORK on an "ALL INDIA BASIS".

Examples: "NATIONAL BUILDING CODE" has been evolved & so also "COMMON GENERAL CONDITIONS OF CONTRACT" but have not been mandated as applicable either by Govt. of India or any one of the States.

- No common: "CONSTRUCTION LAW" exists.
- No common Regulatory Authority available on Pan India basis, resulting incompatibility among the Institutions/ Organizations.
- Both service and sales tax are applicable for Construction Industry
- The Construction activities are administered through almost 32 laws, rules and statutes.

3.3.0 Other Thrust Areas

The following thrust areas in addition to those described in the preamble were also addressed

- i. Tax regime
- ii. Workers' Cess
- iii. Self Regulation issues
- iv. Need to have credible Third Party Rating
- v. Provident Fund

3.3.1 Tax Regime

The Construction activities are subject to both the service as well as the sales tax. This is due to the fact that the activities have no clear definition as to where, they could be treated as an Industrial activity or as services.

The resultant is since the year 2007 the Industry is arbitrarily being subjected to both the taxes. This raises.

- a) Opaqueness in working arising out of subjectivity.
- b) Higher costs of services.
- c) Disputes & litigations leading to time & cost overrun in execution of Projects.

This needs immediate corrections & the activities be defined either as Industrial activities or as services.

3.3.2 Workers Cess

Since 1996, a cess amounting to 2% of contract value being executed by any contractor is being deducted as the mandatory workers welfare cess.

The sums, deducted, by various state Governments have now aggregate to over Rs. 22,500 crores & are lying unutilized.

It is recommended that a large portion of this sum be utilized for upgrading the skills of the workers, or to be used for improving their living conditions at the Project sites.

3.3.3 Apart from the actions to be taken by the Government, the constituents of the construction Industry should also observe and instill self regulation.

This could be done through the Industry associations such as Builders Association of India, CREDAI, CFI and such others .

The focus should be on

- a) Labour welfare measures.
- b) Adhering to environment norms.
- c) Following ethical work practices.
- d) Join apprentice ship programmes to improve the skills of Human Resource engaged by them.

3.3.4 Provident Fund for the workers.

Like the workers welfare cess, as per the statutory requirements, the construction workers, too are covered under the PF schemes.

Over last 20 years, substantial unclaimed deposits are lying with the PF commission (Appex value Rs. 25000 crores +). The beneficiary is

- a) Educationally challenged
- b) Migrant
- c) Works for part of the year in infrequent patches.

Thus the monies deposited remain unclaimed. The PF Commission has not been able to devise a workable & efficient mechanism till date.

It is therefore proposed that

- a) The unutilized & unclaimed sums thus kept in deposit be utilized to develop the skills of construction workers through HRD organizations, such as CIDC & State Academics etc.
- b) A sub trust be created effectively manage this fund.

3.4.0 Good Practices Recommended

- While discussing the Provident Fund issues, members suggested to create a sub-trust for Construction industry under Provident Fund Department, which would look into –
 1. Refund process to workers
 2. Utilization of unclaimed fund for the welfare of the Workers.
- A nodal Regulatory Authority be created to administer & monitor the functioning.
- The said Authority should "REVIEW MONITOR" periodically & submit its reports regularly to the "PLANNING COMMISSION", "GOVT. OF INDIA & VARIOUS MINISTRIES", so that they can be acted upon
- It should act as the nodal organ of the Government on the total issue of "CONSTRUCTION & PROGRAMME IMPLEMENTATION". This Ministry could be supported by the organization such as CIDC, which has been established by The Planning Commission & act as the "NODAL AGENCY" for "CONSTRUCTION & ITS RELATED ISSUES".
- The Statutes of the Ministry of Construction, Government of Japan and the Ministry of National Development, Government of Singapore may be studied and relevant lessons could be learnt. Such study could be commissioned by the Planning Commission to CIDC.
- Monetary benefits / some concessions should be granted for an organization which follows environmental protection system / process during execution and operation stage.

3.5.0 Way Forward

- A "COMMON CONSTRUCTION LAW" should be "FORMULATED" & made "APPLICABLE FOR ALL OVER INDIA".
- A common Regulatory Authority with Technical/ Judicial/ Administrative Powers to implement.
- A singular taxation structure need to be devised.
- A National Construction Regulatory. Authority be established.
- The above shortcomings cause enormous hurdles like clearances, time delays and cost overruns. Different bodies are involved in land acquisition, environmental clearance and other relevant statutory clearances required before taking up the execution, hence, it is required to have an independent empowered body which can interact with different agencies and obtain clearances without the involvement of construction organization.
- CIDC under the auspices of the Planning Commission, should organize a National discussion where CBDT, Central Excise, Ministry of Law are invited to take onward action.

- A sub P.F trust be constituted.
- Classification of Construction Industry be done (e.g Industry or services).

Chapter 4.0

PROCUREMENT SYSTEMS & DISPUTE RESOLUTION FOR CONSTRUCTION SECTOR

4.1 Overview

The procurement systems being adopted both for public & Joint sector works, have been found to have significant flaws & need substantial corrections.

The present form of contract procedures and requirements need major modifications as they do not incorporate technological, labour and other major parameters. They also do not reflect the requirements related to infrastructure development.

- 1 The present contract procedures for procurement of contractors are highly cumbersome and costly, both for the project owner and the contractors. For example, in many instances, the cost of advertising for a job itself is more than the actual value of the assignment.

The procurement process comprises of following steps

1. Detailing the project after establishing the feasibility, and after securing all sanctions including financial sanctions.
2. Preparing the prequalification / registration documentation and obtaining the bids and /or
3. Inviting the techno-commercial bids through public notifications.
4. Evaluating the bids and awarding the work

It is estimated that the departmental expenditure adds in above mentioned activities up to a whopping 16% of the cost. After adding supervising and monitoring expenses of about 6%, the total cost of procuring, supervising and monitoring comes to about 22% of the cost of asset created.

The pre award costs include.

- a) Publishing advertisements in National/ Local dailies and on the web sites.
- b) In case of lack of adequate response, retendering and rebidding is resorted to, which is mandatory.
- c) Evaluation of bids, organizing meetings & publishing corrigendra, in case of any modifications in the specifications & conditions.
- d) Concluding the award process.

All this is done to have “transparency” in public Procurement systems.

Whereas, it is a necessary requirement to be transparent, the mechanism followed, results in such expenditure.

This could be moderated, with introduction of a National Data base of service providers. The database could be prepared after making physical check of the prowess of agencies & when needed, could be made available to desirous Project Authority.

2. **Secondly, there is no standardized contract procedure and evaluation criteria. This has adversely affected the credibility of the whole system and has given rise to multiplicity and corruption. Further there are no restrictions on entry into this sector by unqualified players.**

There is a strong case for standardization. Whereas the special conditions could vary depending on the exigent needs, yet the core conditions could remain standard, to

bring much needed transparency & avoid subjective interpretation of clauses, leading to disputes.

- 3 **Thirdly, contract conditions are not equitable.** Structure of Performance guarantees, and other requirements, only increases the cost of operations without passing any substantial gains to the project and the industry. Even conditions like, damages to contractors due to delays by project owner, resource mobilization through advances and cost escalation are not effectively laid out, thereby causing disputes & time overruns in execution of projects.
- 4 Moreover, the contract criteria of awarding works to the lowest cost bidder also hinders in the process of adoption of better technology, best practices and quality. This only results in cost cutting practices by contractors, preventing passing on the benefits to the workers.

In order to have a better system of award, the focus, now, must shift to “Effective Lowest Price” from the “Lowest Price” syndrome Grading of Construction Entities, may be adopted as an effective tool to determine the Effective Lowest Price. The practice is in vogue in Singapore, as adopted by the Ministry of National Development, Government of Singapore, and may be suitably transformed and adopted for Indian situations

Determination of Lowest effective Price (As practiced in Singapore)

The base benchmark for assessment of the effective price is the grading / rating score of any agency. Normally 15 stages of grades / rates adopted to define the prowesses of an entity with Highest grade being allotted a moderation factor of 1.0.

For selection of an agency the project owner can decide the cut off grade (Normally not 4 stages lower than the highest sought grade) for each grade, a reverse premium is determined. Say for highest 1.0, second highest 0.98, third highest 0.96 and so on, thus granting an equalization premium of about 8% when compared between the highest and lowest acceptable grade.

To determine the effective lowest price is divided by the reverse premium

Example

Agency	Quoted Price	Grade	Reverse Premium	Lowest effective price
A ₁	100	H ₁	1.0	100
A ₂	99	H ₂	0.98	101
A ₃	98	H ₃	0.96	102
A ₄	97	H ₄	0.94	102

Using the premises of Effective lowest price Agency A₁ is declared lowest, whereas if the conventional method is adopted A₁ is the highest price bidder. This principle is applicable in case of CONQUAS Evaluation System, as detailed in Chapter 4.7.4.

The Standard Contract Document for Domestic Bidding as adopted by Govt. of India, Ministry of Statistics and Programme Implementation circulated as Guidelines for preparing proper contract documents has also partly adopted a similar practice. In these guidelines weightage has been provided as a condition “to qualify for award of the Contract” where a Minimum Grade under CIDC-ICRA grading, interalia, is one of the important conditions for Qualification. While evaluating and comparing various ‘Bids’ the Employer would take into account the minimum grade depending on the nature and size of project.

Technology capacity of Contractors should be made part of contract requirement for different categories of projects – based on their value and it should also be part of pre-qualification process. Efforts could be made to include contractors’ proposals as part of contract conditions. Such a practice should reduce disputes which often arise out of incomplete understanding of projects by bidding parties.

Availability of some minimum percentage of skilled and certified manpower with Contractors should be made part of contract requirement for different categories of projects based on value.

Incentive for better efficiency should be made part of the contract requirements.

A regulatory mechanism needs to be evolved so that contract procedures adopted in Government Construction project are followed by entities in the private sector also.

- 4 The contract provisions also do not have focus on rewarding better performance of execution agencies. A system of incentives for timely completion and better performance needs to be integrated in procurement procedures by all public agencies.
- 5 Last, but not the least, proper code of ethics, and adherence to good work and business practices, does not exist. Such situation leads to low value addition, apart from lower image of the Industry.

The Ministry of Programme Implementation, Govt. of India, has finalized and issued a set of Uniform Contract Conditions, and also a model bidding document for domestic contracts as a guideline. These need adoption by various Government departments/ organizations and PSUs. The private sector should also be advised to harmonize their procedures suitably with those being followed by the public sector. For public sector organizations and PSUs government should make necessary policy intervention to convert these guidelines into specific directions.

Similarly for Public Private Partnership/Concession Contracts the model agreement document prepared by the Planning Commission for Highway / Road Contracts could also be adopted as a base.

It is therefore; recommended that, through adoption of standardized Conditions of Contract the reduction in cost and time can be achieved. Following should also be adopted.

- 1) Instead of pre-qualifying the agencies time and again, departments desirous of engaging the contractors can resort to choosing contractors on the basis of their grading, followed by a periodical surveillance.
- 2) Resort to electronic tendering process, publishing tender notices online, online Contract Bidding documents and 'Reverse Bidding' to eliminate unfair competition.
- 3) The Bidding Process can be online, including tender opening, evaluation, submission of earnest money and award.

The suggestions made above can reduce time and costs in the procurement process and enhance the transparency. With latest IT Act in place and e-signatures legally valid, the suggestions are feasible.

4.2 Dispute Resolution

Construction Industry being the largest asset creator and second largest component of the economy having unique dynamics of business **it is crucial that disputes be resolved speedily to minimize the business losses and capital blocked due to delayed and Ad-hoc process of dispute resolution.**

Till the enactment of Arbitration and Conciliation Act 1996, the process of Arbitration was totally ad-hoc. The 1996 Act has provided for Institutional Arbitration mode, and has no doubt taken some bold initiatives attempting to provide an effective framework for resolution of disputes without depending on the overburdened judicial system of the country. It has, to some extent, addressed the concerns arising out of globalization of business. However, the need has been widely felt to develop and set up in position the Institutional frameworks which can effectively tackle the hard-core problems of time and cost of the arbitration proceedings. Unfortunately in the absence of nationwide consensus the arbitration process continues to be predominantly ad-hoc leading to a situation that as of 2010 (CIDC survey), the amount of capital blocked in construction sector disputes was over Rs.1,35,000 crores. This is an ironic situation particularly due to the fact that a large number of projects are of national importance and country is keen to be a major player in the globalised economy and to have world class infrastructure.

4.2.1 Ad-hoc Arbitration

Since the Arbitration and Conciliation Act 1996 came into force, there is certainly an improvement in the number of disputes resolved. However, a number of grey areas remain which are being looked into by the Law Ministry. Experience for last one decade no doubt highlights the fact that the mechanism is certainly an improvement over the earlier practices, but it has not been possible to mitigate problems in the critical areas. It has been noted that there is an increasing tendency to appeal on grounds of "misconduct" on the part of arbitrators particularly taking the view that they are not being approved by any responsible organization. This has added to the delays in the arbitration process which are increasingly resulting in time and cost over-runs of projects. Yet another grey area pertains to non-availability of clearly defined eligibility criteria and code of ethics with the appointing authority. Eligibility criteria for Arbitrators is not fully transparent and does not follow defined code of conduct.

One of the major reasons attributed to the poor effectiveness of the ad-hoc Arbitration process is that at the time of signing the arbitration agreement, the owner insists on having arbitrators from among its own serving or retired officers or a panel with which it has some direct or indirect association. While this works in a large number of cases where the real intent of both sides is generally to reach an agreement, this also provides grounds for resorting to judicial remedies after the award is given.

As is seen from the foregoing that major shortcomings of ad-hoc arbitration process include inter-alia, there is no provision of specific rules and partners have to sign an agreement regarding the rules to be followed, and there is no provision for a neutral body to administer and supervise Arbitration. Besides, there is no quality control of Arbitrator's qualifications and expertise, no assistance is available in managing Arbitrator's fees, lack of close supervision/monitoring of arbitrator's progress, and any administrative support.

4.2.2 Institutional Arbitration

In view of the deficiencies of the ad-hoc arbitration system, it has been a long felt need of the construction industry to introduce new measures so that disputes are resolved in a fair, speedy and cost efficient manner. In accordance with the IAA 1996, there exists now, the provision of resolving disputes through Institutional Arbitration mode. The main objective for such an effort is to develop and place in position an Institutional Arbitration system. The main features of such a system are –

- a) appointment of arbitrators from the International and National or Regional panels,
- b) to give the time commitment with a view to conduct arbitrations in an expeditious and cost effective way
- c) ability to act for conducting an audit for possible conflict, appointing an institutional appointee to execute institutional code of ethics,
- d) having an hierarchy to include Nominations Committee, Confirmation Council, pre-determined Arbitrators, Fees Vs Lawyers Fees,
- e) Existence of the code of ethics for an Arbitrator focusing on impartiality, transparent communication, agreement on fees, confidentiality.

Thus following are some of the salient elements of Institutional arbitration;

- 1 Arbitration under Institutional rules formulated by Institution and revised periodically based on user's feed back .
- 2 Panel of accredited Arbitrators based on selection criteria to maintain quality and standards and code of ethics/conduct.
 - 3 Negotiable terms of appointment whenever there is a default appointment.
 - 4 Management of Arbitrator's fees
- 5 Monitoring and supervision of progress of case
- 6 Arrangement of logistics, facilities and services for hearing.

Thus main advantages of Institutional Arbitration over Ad-hoc Arbitration are,

- 7 helps in controlling quality of Arbitrators,

- 8 helps in managing arbitrators fees
- 9 help ;in maintaining a close supervision and monitoring of arbitrator's progress
- 10 helps in providing administrative support for the whole process.

Disputes arising out of project execution need speedy and effective settlement. With multiplicity of contract forms, varied dispute resolution mechanisms, lack of willingness of parties involved to honour the awards, and no effective implementation mechanism in practice, in most cases the disputes end up in courts of law and remain unresolved for long durations.

A corrective measure needs to be taken to insure the following:

- i) Laying down the eligibility criteria for nomination of arbitrators.
- ii) Laying down the work ethics for nominated arbitrators, and setting up an implementation mechanism.
- iii) Drawing up and adopting the arbitration and dispute resolution mechanism, in line with UNCITRAL provisions.
- iv) Notifying and embodying the approved mechanism as a part of Standard Contract Conditions.

It is, therefore, proposed to constitute a nodal Committee/ Council of Arbitrators, which may operationalize these recommendations. The contract guidelines approved by the MOSPI have made such provision through creation of such mechanism under the auspices of CIDC, the Apex body, which needs to be developed at an early date. As a sequel, Construction Industry Arbitration Association has now been incorporated which shall dispense the Industrial Arbitration which is currently being in practice.

4.3.0 Impediments faced by the Industry

- ❖ Non standardized Contract documents is the main handicap
- ❖ ITEM RATE CONTRACTS must be limited to a minimum & it is time India moves over from to the globally accepted practice of E.P.C CONTRACTS.
- ❖ DISPUTE RESOLUTION & MITIGATION is presently not structured into all the Contract: thereby leading to litigation & consequent delays.
- ❖ There is no centralised agency to publish Cost Index for the projects.
- ❖ Procurment systems based on least cost principle need to be reviewed as they may not be suitable for all types & speed of procurement
- ❖ The enabling planning of the projects is not done by the departments.
- ❖ The work & contract manuals being followed by the departments are archaic & in many cases self contradictory.

4.4.0 Thrust Areas

The following thrust areas were outlined that need to be addressed by the Working Group on procurement systems & dispute resolution issues for the construction sector for the 12th plan.

- Standardization of Bidding & Contract Documents for each Sector
- Procurement issues at National level & International Trade issues

- Institutionalization of Arbitration/ Mediation.

Procurement Systems should have following five necessary steps-

- vi. Standard Operating Procedures (SOP)
- vii. General Escalation
- viii. Contract Conditions
- ix. Mode of calculating Cost Indices
- x. Viable Dispute Resolution Mechanism

4.5.0 Good Practices Recommended

- Contract conditions should, forthwith be standardized. This would bring comparable assessment & enable review monitor optimization. The procurement manuals developed by Ministry of Program Implementation should be adopted.
- Dispute resolution through arbitration would need amendment of Indian arbitration act 1996: which awaits enactment.
- The Arbitration rules & procedures being subscribed by the construction Industry Arbitration council be adopted Nationally.

4.6.0 Way Forward

- Members realized that for smooth functioning of the projects, there is a need of uniform contract conditions which should clearly mention –
 1. Disputes should be dealt by a Institutions for Construction Industry comprising members from Technical, Judicial, Administration.
 2. Median cost principle for some procurements may be studied for their applicability, instead of choosing the lowest bidder, otherwise effective lowest price be worked out.
 3. Enabling Planning by the works departments should be made mandatory.
 4. A separate organisation may be designated by the Government of India exclusively for Construction Industry who will publish cost indices for projects, Materials, labour, machinery & POL
 5. The contract conditions should be harmonized & standardize & be adopted at National level.
 6. Ministry of Finance should issue a directive to follow these conditions, which have been formulated by MOSPI, along with the SOP/Workers Manual.
 7. Arbitration should be Institutional.
 8. A national Data base of service providers be prepared.
 9. Grading of Construction entities to be made mandatory as an evaluation tool.

Chapter 5.0

HUMAN RESOURCE DEVELOPMENT FOR CONSTRUCTION SECTOR

5.1.0 Overview

- In order to make a quantum leap to raise the capability of delivery by 45% rising to 150% the role of Human Resource Development in Construction Industry is vital.
- The approximate number of persons employed in Construction Industry are 41 million, where over 85% are serving as workers and are bereft of any formal training.
- There is acute shortage of work hands specially in mechanized trades.
- On account of Natural attrition and the need of skills of contemporary trades, Construction Industry needs infusion of at least 6 million persons/ year.
- The total training capacity is woefully inadequate. Against a requirement of over 3.5 Million trained tested & certified workers, the capacity available is about 0.5 Million/annum.
- The ITI's established both in private and public sector are not able to offer trades to young persons to join the Industry. Most of them only offer the trades suiting the needs of manufacturing Industry & not many trades relevant to construction Industry are on offer.
- Schemes such as NREGS have further reduced the state of fresh entrants to Construction Industry. This is due to the fact that the unskilled / semiskilled workforce is no more desirous of migrating since they are able to source employment locally.
- Skill upgradation schemes launched by the Governments both at State and Central Government level are not really adequate and the Industry needs to start several apprenticeship schemes. Only a handful of large firms organize training programmes. Apprenticeship is not available.
- The funding requirements for training and skill upgradation and extension of loans by NSKDF (National Skill Development Fund) are neither practical nor workable. The funding offered is as loan to the training providers and the recipients are financially challenged, and therefore the proposition becomes unviable

One of the major impediments faced by the Construction Industry in raising the levels of productivity, adhering to the stipulated standards and meeting the quality, is acute shortage of skilled manpower at workers and supervisory levels and also lack of well experienced construction engineers.

A perceptible shift in the skill demography is amplified elsewhere in this chapter, which depicts the decline in the share of skilled work persons and a continuing shortage of other levels of manpower employed with the Construction Industry. To meet the demand of trained and certified workers there is an urgent need to introduce a system of 'Graded Certification' commensurate with proficiency levels. It may be necessary to develop some short-term courses for certain trades where ITIs have long duration courses. Identifying the main causes of the

impediments coming in way of improving the availability of trained man-power, following could be stated.

a) Workers

- (i) Near absence of formal training and skill certification systems and institutions & over reliance on conventional sourcing of manpower.
- (ii) Non formation of an integrated National Plan & therefore a conscious initiative to develop the skilled work force, including those required for facilitating rising mechanization and value added skills needed for induction of modern technologies.

b) Engineers

- (i) A perceptible reduction of share of new trainees in Construction Engineering Streams (Civil, Electrical, & Mechanical Engineering) due to lack of interest of Institutions to raise intake levels. Due to lack of placement opportunities for civil engineers during recent past most of engineers institutions have reduced intake in related courses. The trend has started reversing but needs stepping up considerably.
- (ii) Low level of earnings for professionals, due to very rigid and traditional Industry norms, arising out of the output with low value addition. There is a need, therefore, to regulate adequate intake of civil engineers in engineering institutions to mitigate existing shortage.
- (iii) Better prospects offered to the graduates by other streams of business Ex. IT, Management, Banking etc.
- (iv) Absence of on the work internship for the teachers & also the students.

It is therefore imperative that conscious efforts need to be made to arrest this phenomena and reverse it.

c) Contractors/Entrepreneurs

Some of the PSUs during their consultative group meetings in connection with 11th plan, have conveyed lack of adequate number of contractors for their projects. In several cases specialized contractors with proficiency in specified nature projects are required. These PSUs have even recommended setting up a few contractors' training institutions. This would also help in repeated demand that entry into construction industry should be restricted to qualified people.

One of the important issue affecting development of construction industry is near absence of support systems to develop entrepreneurs, to instill strength through provision of support services.

It is noteworthy to mention that, as of now, Highway and Road Construction Sectors are facing acute shortage of contracting agencies, to take up the planned and sanctioned work packages.

Whereas the established contracting agencies are overloaded with the work, new agencies are not being created. The situation shall take grave proportion during the 12th plan period and therefore it is proposed that the overall HRD plan must include this aspect as well.

d) Entrepreneurs for the manufacturing sub-sector

Most of materials continue to be manufactured in informal sector support and due to lack of financial support and technical and managerial capabilities they find it difficult to induct modern technology in their enterprises. There is a need to institutionalize training programs for first generation /small start up entrepreneurs.

e) Asset management & Maintenance Professionals

Most local bodies and state governments find it difficult to efficiently manage and maintain their physical infrastructure and important building structures particularly due to lack of trained professionals. With the level of investment envisaged during 12th plan the state local governments need to prepare GPA/GIS maps for introduction and get their selected engineers trained in maintenance and structural rehabilitation works.

f) Quality & Safety Assessors and Regulators

Construction industry has been witnessing decline in quality ;and safety aspects during past one/two decades. While private sector has taken up issues of quality enhancement in their housing and commercial projects, more aggressively, the public sector has yet to adopt practices for strict adherence of quality in their works. With rising complexities of modern construction and large areas of the country, being prone to natural disasters, the issue of training of Construction Quality and Safety Assessors has been raised at various fora. CIDC has been interacting with several international organizations and has initiated training programs of quality assessors. It is, therefore, necessary that the integrated National Plan for Human Resource Development include specialized training programs for quality and safety Assessors for enhancement of capabilities of the Indian Construction industry.

Specially in case of workers, a few measures have been taken by the State Government of Madhya Pradesh, Rajasthan, Bihar & Hariyana, in the context of training and certification of construction workers, in association with CIDC, through making available the physical infrastructure of the ITIs situated in their States, where training in self financing mode is being conducted by CIDC and skill certification by CIDC.

The Ministry of Labour and DG(ET), NCVT (national Council of Vocational Traininig), have taken measures to launch skill certification initiatives through CIDC and alos under MES/SDI schemes, and some Industry Organizations are conducting their captive training programmes.

This, however, is inadequate to meet the ever growing demand of skilled work force. A National Strategy therefore needs to be devised, to train and certify the workers from this informal, but important sector. **Construction Workers Welfare Act 1997, aims to garner resources, through a cess, however does not lay down specific norms for expenditure of the sums, thus collected.**

It is proposed that a portion of this fund could be utilized to meet these exigencies, through a nominated and authorized nodal agency.

Then, there is another issue of the Provident Fund for Construction Workers. Whereas, large sums of monies are being deposited with the PF Trust every year, use and withdrawal of these monies by the beneficiaries, is near absent. Proceeds of this deposit, lying unutilized which is estimated at about Rs. 25,000 crores, could be utilized for Institutional initiatives of skill upgradation.

It is proposed, therefore to create a dedicated fund for HRD in Construction Industry and a National Plan on HRD be developed.

g) Engineering Profession

The next major issue needing attention is, continuous skill upgradation and reversing the attrition of Engineers from the Construction Industry.

It is proposed that an Engineers Bill be enacted to look into issues of professional development of practicing engineers and Industry be encouraged through some tax incentives, which could be availed for HRD initiatives launched by them.

Engineering Council of India, the apex body, having representation of several Engineering Professional organization has made several proposals to the Government of India, in this context, which may be studied and acted upon.

Necessary modifications in regulatory frame work, and procurement systems, of course would be needed, where engagement of certain minimum percentage of trained, tested and certified manpower at all level, need to become an essential prequalification condition for award of the work.

5.3.0 Impediments faced by the Industry

- a) No apprenticeship schemes are being run in Construction Industry
- b) The Government support is just not available to the training providers, inspite of all State Governments collecting construction Workers Welfare cess which remains grossly unutilized.
- c) There is no Central Plan to support this important initiative, nor any financial support.
- d) The National Skill Development Mission, created recently, only lends the resources, which is not a viable mode of availing resources & there fore a separate dedicated fund known as construction skill development fund (CSDF) to be created. It is proposed that, this fund should be of Rs. 200 crores/year and strive to obtain similar contribution from Industry to facilitate training at least 200,000 workers/year.
- e) Formally trained & certified skilled / semi skilled labourers are not available.
- f) There is no regulation to insist on Certification of skills for employment.

g) The Internship programmes for Engineering students are not mandatory.

f) There are no training programmes for contractors development.

5.4.0 Thrust Areas

The following thrust areas were outlined that need to be addressed

- Training
 - b. Workers
 - c. Supervisors
 - d. Engineers/ Managers
 - e. Contractors.
- Institutional initiatives in Training
- Review of roles of Institutions/ organizations involved in Training & Certification

5.5.0 Good Practices Recommended

- Planning Commission Govt. of India & CIDC must organize work shops at every state capital; for the respective state Govt's Engineering Universities & Construction entities therein; to evolve a mechanism to improve the engineering curricula and also introduce apprentice ship.

- Planning Commission, Govt. of India & CIDC need to create a structured interface with Ministry of HRD, UGC, AICTE: on mandate extended to CIDC of Govt. of India, National skill development council augment of Human Resources in.

- (iii) Construction & Engineers

- (iv) Construction & skilled workmen.

- Create a NSDF with a grant of Rs. 200 crores/year.

5.6.0 Way Forward

Although 4.1 crore people are employed in the Construction Industry, there is acute shortage of trained manpower. There are training programs for workers, but their quality is not very good. Moreover Trainers are also not available.

Strategies to train manpower on a huge scale were outlined.

The members of the Working group made following observations:

- 1) Corporates should adopt villages, in order to attract talent and train people.
- 2) SDI (Skill Development Initiative) Scheme has the resources. These resources can be utilised to train manpower.
- 3) Retired Engineers/ Managers and artisans should be encouraged to teach and impart Training.
- 4) Training and Testing Boards should be established.
- 5) To reach to the young unemployed people, Youth Clubs are to be approached. Construction Training should be taken as Youth training.

- 6) Campaigns should be organised for careers in Construction. And these campaigns should be linked to awareness programs.
- 7) Lectures, Literature and short films should be prepared, so as to create awareness among the people. The idea is to make the people convince that with adequate training, they will not only be able to secure employment not only in India, but also anywhere in the World.
- 8) Incentives should be given to petty contractors for engaging skill/ certified workers. Based on the productivity of the workers, incentives can be decided.
- 9) Steps should be taken to arrange classrooms at Site. There should be one training room at Site, and attendance should be made mandatory.
- 10) Curriculum for Construction should be developed and harmonised.
- 11) Steps must be taken to establish Department of Construction Engineering in Colleges/ Universities.
- 12) There is a need to evolve a mechanism to allow following:

i) Workers

- a) Making training mandatory to provide allocated funds under all Rural development projects.
- b) Permit the dormant resources lying with the Workers Welfare funds/PF to be used for training and skill development.
- c) Providing tax concessions to the training providers from the Industry.
- d) Improve the employment conditions of the workers for encouraging them to join the Industry.

ii) Engineers & Supervisors

- Apprenticeship and field working should be introduced in the syllabus of the Engineering programmes.
- Hybrid branches such as “Construction Engineering” instead of Civil/ Electrical/ Mechanical Engineering be started.
- Continuous faculty skill up gradation programs to be introduced.

Chapter 6.0

CONSTRUCTION SECTOR
(INSTITUTIONAL FINANCING WORKING)

6.1.0 Construction Sector and Indian economy

6.1.1 The Construction sector has been contributing around 8% to the nation's GDP (at constant prices) in the last five years (2006-07 to 2010-11). As indicated by Table-2, GDP from Construction at factor cost (at constant prices) increased to Rs.3,84,629 crore (7.9% of the total GDP) in 2010-11 from Rs.2,84,798 crore (8% of the total GDP) in 2006-07. The increase in the share of construction sector in GDP has primarily been on the account of increased government spending on physical infrastructure in the last few years, with programmes such as National Highway Development Programme (NHDP) and PMGSY/Bharat Nirman Programme receiving a major fillip of late. The construction industry is experiencing a great upsurge in the quantum of the work load, and has grown at the rate of over 10% annually during the last five years. Although various steps have been taken to strengthen the construction industry, it is crucial to take necessary measures in order to prepare the industry to meet the challenges of growth.

Table-2: Construction Sector-Macro Aggregates

Macro Variable	2006-07	2007-08	2008-09	2009-10	2010-11
GDP from Construction (at Constant Prices) – Rs Cr	284798	315389	332557	355918	384629
Share of Construction in GDP(%)	8.0	8.1	8.0	7.9	7.9
Growth rate for GDP in Construction(%)	10.3	10.7	5.4	7.0	8.1

Source: Handbook of Statistics, RBI-2010-11

6.1.2. As per the principal findings of a study by IIM-Ahmedabad (July 2000) entitled “Impact of Investment in the Housing Sector on GDP and Employment in the Indian Economy”, the Construction Sector ranks higher than the important sectors like Transport and Agriculture (whose ranks are fifth and sixth respectively out of 14) in terms of additional income generated in the economy as a whole. A value of 4.71 Multiplier indicates that a unit increase in the final expenditure on the Construction sector would generate additional income in the economy as a whole which would be almost 5 times as high as the direct income generated within the construction sector itself.

6.1. 3 Construction sector has huge employment generation potential. It ranks 5th and 7th in terms of employment multipliers of Type-I & II respectively. A value of 7.76 for Employment Multiplier of Type-II indicates that an additional unit of final expenditure in construction sector induces overall

employment generation in the economy as a whole by an extent which is eight times the direct employment generated in the construction sector itself.

6.1.4 Key drivers of growth of construction industry

Construction sector has two key segments: (i) Residential and Non-Residential Buildings (Residential, commercial, institutional, industrial); and (ii) Infrastructure. Infrastructure contributes roughly 50% to the construction sector and the remaining is through residential and non-residential building industry. The total market size for the period 2011 to 2016 is expected to be of the magnitude of INR 52,309 billion (Table-3).

Table-3 India: Construction Industry Estimates (INR Billion)

	2012/13f	2013/14f	2014/15f	2015/16f	2016/17f	Total
Construction Industry Value, INR billion	7,668	8,875	10,316	11,860	13,590	52,309
Infrastructure Industry Value As % of Total Construction	49	50	50	51	52	
Infrastructure Industry Value, INR billion	3,723	4,413	5,204	6,059	7,017	26,417
Residential and Non-Residential Building Industry Value As % of Total Construction	52	50	50	49	48	
Residential and Non-Residential Building Industry Value, INR billion	3,945	4,461	5,112	5,800	6,574	25,893

Sources: BMI forecasts, Census and Statistics Department/ILO

The Key drivers of growth of construction industry are:

a. Growth in infrastructure:

- Approximately USD 1 trillion is to be spent in the next five years on infrastructure. While 50% investments in infrastructure will be done by the government through cash contracts, the remaining will be either pure private investments or PPP projects;

b. Growth in Building sector:

- Industrial growth: This sector sees a steady growth and contributes to the construction sector in the non-residential segment.
- Real estate commercial: A vibrant and growing service industry leading to a real estate and logistic boom contributing to the growth of construction in the non-residential sector: IT growth would continue to create a demand for commercial facilities. STPs and SEZ's

are being built by real estate developers. Hospitality and tourism industry is driving the demand for hotels and resorts; Retail growth on account of increasing consumer disposable incomes is driving the demand for commercial area development on a large scale. Associated logistic services to service the supply chains require warehousing facilities.

c. Growth in housing:

- The current trend in real estate market is that after making investments in land the project construction is mainly retail financed i.e. through advances/milestone based payments from owners.
- The real estate developers traditionally employed contractors for construction of projects. Several large contractors are transitioning towards becoming real estate developers as well.
- In cases where private developers undertake affordable housing projects; retail financing would be a challenge as the ability of the retail investors would be very limited. One of the greatest challenges in the implementation of RAY is that there would be a need for addressing the housing loan requirements of this segment. For example the slum dwellers and EWS segments would find it challenging to pay the developers / contractors on a regular basis.
- In case of construction by government and its agencies in government housing or affordable housing (LIG and EWS segments), payments will be done by the government.

6.2.0 Flow of Funds to Construction Industry in India

6.2.1 The construction sector, including the residential & non-residential buildings and infrastructure sector, is attracting both domestic (government funding, institutional funding) as well as foreign direct investment. Before the year 2000, the deployment of gross bank credit in the construction sector was declining, e.g. from 2.13 per cent in 1990 to 1.37 per cent in 2000. In order to increase the flow of institutional credit to the construction sector, it was declared as an industrial concern under the Industrial Development Bank of India Act in March 2000. Table-4 shows the flow of bank credit to construction sector during 2006-07 to 2010-11. In the year, 2010-11, around Rs.50135 were lent by banks to the construction industry which was 1.4% of the gross bank non-food credit disbursed during the year. While this step was in the right direction, it is necessary now to encourage banks and lending institutions to develop lending norms and special funding instruments that could address both the requirements of

the construction industry as well as the concerns of the bankers. The need for specialised financial may also be considered.

Table-4: Flow of Bank Credit to Construction Sector
(in Rs.Crore)

	2006-07	2007-08	2008-09	2009-10	2010-11
Gross Bank Non-Food Credit	1801240	2204801	2601825	3040007	3667354
Bank Credit to Construction Industry	19997	27945	38505	44219	50135
Percentage share (%)	1.1.	1.3	1.5	1.5	1.4

Source:
Annual
Reports,
RBI

6.2.2
Constructi
on
activities

including housing, roads and highways have also been attracting FDI inflows. Table-5 depicts the year wise and cumulative FDI flows into construction activities including roads and highways sector. The cumulative FDI inflows from April 2000 to August 2011 into construction activities stood at around US \$9417 million or Rs.42,072 crore, which is nearly 6% of the total cumulative FDI inflow into the country during same period.

Table-5: Flow of FDI in Construction Activities
(including Roads & Highways)

	2007-08	2008-09	2009-10	2010-11	Cumulative(April 2000 – Aug 2011)
In Rs. Crore	6989	8792	13469	4979	42,072
In USD million	1743	2028	2852	1103	9417 (6% of total FDI inflows)

Source: DIPP, MoC&I

6.2.3 Even though the construction sector is attracting both domestic (government funding, institutional funding) as well as foreign direct investment, more resources are needed for the sector to fulfil the ever rising pressures of enhancing the housing and infrastructure sectors in the country. Institutional financing of construction sector still remains an underdeveloped area in India.

6.2.4. The high cost of raising finance also translates into high costs, which again has a cascading effect on the economy. Appropriate measures and instruments should be formulated and implemented to reduce financing costs and ease the flow of funds to the industry.

6.2.5 Taxation: The construction sector experiences a very high incidence of direct and indirect taxes for construction and construction-related activities as compared to other sectors. The taxation and regulatory

systems pertaining to construction should be reviewed with a view to rationalize the same and eliminate multisource taxation. Greater clarity needs to be brought out on the treatment of the sector as ‘Industry’ or ‘Service’ for taxation purposes. In addition, under the current fiscal regime developers can spend more than 18 per cent in taxes and levies on their activity. With the addition of stamp duty and other charges, the end user can pay up to 27 per cent above the cost of construction. When dealing in a price-sensitive market, these increments are particularly significant.

6.3.0 Existing Shortcomings in Institutional Financing for Construction Industry

6.3.1 The Indian construction industry is faced with high operation, maintenance, and financial costs. This aspect is further exacerbated by inadequate access to institutional finance, especially for small contractors who execute over 90% of the total construction works. Moreover, subsequent to the conferring of Industrial Concern Status on the construction industry, existing financial institutions, and banks have not adopted construction industry-specific lending norms and eligibility criteria for the borrowers from the construction sector neither introduced any special incentives or schemes for financing import of hi-tech construction equipment for infrastructure projects.

6.3.2 As the magnitude of housing shortage in the country is huge requiring substantial investments in housing and related infrastructure, the Banks, Financial Institutions and Housing Finance Companies have not lend to the poorer segments of the population for affordable housing segments. The priority sector lending by Banks for affordable housing loans up to Rs. 5 lakh constitute only 22.75%, of the total lending to housing sector as per the housing loan data received from the 26 leading public sector banks including SBI for the year 2010-11. Further, as per latest BSR report of RBI for the period ended March 2010, loan sizes up to Rs. 5 lakh constitutes 24.16% of the total outstanding housing loans of Rs.3, 06,307 crore.

6.3.3 The massive shortage for housing among the urban poor and the non-availability of any authentic data to substantiate the view that all the amounts which were lent by the banks in the category of less than Rs.5 lakh has actually not gone to EWS/LIG show that credit flow to these segments is meagre. This can also be substantiated from poor performance of schemes like Interest Subsidy Scheme for the Urban Poor (ISHUP) and 1% interest subvention, etc. It can thus be safely concluded that a very low proportion of the low ticket loans have actually gone to the EWS/LIG individuals.

6.3.4 The bulk of the potential buyers for affordable homes might not be able to access formal credit markets. Mortgage penetration is already low in India and mechanisms are only now developing to maintain credit histories. Informal sector workers in particular have variable income streams and in some cases, might not have access to a bank account.

6.3.5 Developers require both a down payment and assurance of regular EMIs to make the sale. Some buyers might not have the capital to make a significant down payment. Even for buyers who can afford the EMIs, the process of ensuring that they will be able to – given the problems described above – have proved to be time consuming and cumbersome for developers. Some non-profit developers like ‘Janaadhar’ have set up their own micro-finance institutions (MFIs) that make loans to clients to enable them to buy their homes. Similarly, Self Employed Women’s Association (SEWA) makes loans to enable slum dwellers to participate in contribution-based slum upgrading efforts. Some commercial developers have tied up with external MFIs to enable financial access. McKinsey recommends the setting up of a mortgage guarantee fund to make such lending more secure, and expand the access of the lower to middle income groups.

6.3.6 The construction sector is characterised by lots of project delays which are due to lack of adequate credit, harassment, problems in approvals, bad image of the contractors/builders, etc. The construction industry also suffers from lack of transparency, lack of regular payment of bills to contractors, lack of appropriate lending & NPA norms, lack of corporatisation of construction industry and lack of a healthier partnership between government and the construction industry.

6.3.7 Key reasons for the reluctance on the part of banks/FIs to lend to the construction industry include: (i) lenders do not understand the working dynamics of the construction industry; (ii) lack of adequate safeguarding mechanisms to assure the banks about the credibility of the industry; and (iii) banks have better options to lend their precious money to sectors with assured returns at much lower risks. There is no appropriate institutional set up to absorb the flow of funds to the construction sector.

6.3.8 Apart from non-availability of credit for the sector, non-availability of bankable DPRs in the construction sector, huge time and cost overruns of the construction projects are some of the reasons for projects in the construction sector not taking off in a sustainable manner.

6.3.9 There is no uniformity in tax rates for different construction projects. The service tax is not payable on works contracts in respect of tunnels and dams whereas power projects are liable to pay service tax. A party who has constructed dam or tunnels and have nothing to do with construction of power house should not be charges any service tax as the same is exempt from payment of service tax.

6.3.10 Another shortcoming in the construction sector in India is that the state governments do not make funds available after they approve the projects. There is no law to ensure that a contract cannot be awarded unless finances are arranged. A programmatic approach for large construction programmes at the State level requiring a planned approach with resources tied up should be encouraged.

6.4.0 Strategies to improve Flow of Funds to Construction Industry

Although the industry is not fixed capital intensive, it is working capital-intensive in terms of gross working capital requirements with high payment receivable risk. However, several large construction companies are gradually transitioning to developer companies. The diversification is either as real estate developers or infrastructure developers. These projects are normally done as independent SPVs but quite often even done by the parent construction company. Some of the large construction companies are now setting up sectoral holding companies for developing projects and invest in multiple SPVs. Thus, there is an increasing need for long term debt and equity by these companies.

The flagship Bharat Nirman programme of the Government of India focuses on the provision of key rural infrastructure like irrigation, electrification, roads, drinking water supply and sanitation, affordable housing, and connectivity via community IT service centres. Similarly JNNURM has provided a boost for the urban infrastructure projects. These programs would provide public funding for projects. Going forward these projects would need to be maintained by the local contractors. Therefore these contractors would grow and need venture capital funding. For the small contractors, it is largely working capital finance that is required by them. There are, thus, five types of financing requirements of the Construction Industry: (a) working capital requirements; (b) Capital requirements for Modernization of equipments and/or Expansion of industry; (c) Project specific bridge loans; (d) Loans for BOT projects; and (e) Equity for BOT and real estate project.

The construction sector remains in need of financial support while sizable funds available with Banks / Financial Institutions remain unutilised. Lenders do not have a reasonably sound and reliable system for risk assessment in the construction sector. The funds requirement of the construction industry is approximately USD 1 trillion with the modernisation requirements of the construction industry estimated to be to the tune of US \$ 150-200 billion. Further, as per the High Powered Expert Committee (HPEC) Report for estimating the investment requirement for urban infrastructure services, the investment requirement for urban infrastructure over the 20-year period (2012-31) is estimated at Rs 39.2 lakh crore at 2009-10 prices. In order to have a sustained and enhanced flow of credit to the construction sector, greater transparency, better corporate governance, sharing of experiences and specific regulations are required. Innovative financing methods/instruments are required to enhance the flow of funds and institutional credit to the construction sector. The Working Group recommends the following key strategies to improve the flow of institutional finance to the construction sector.

6.4.1 Enhancing flow of Finance through Grading of Construction Companies

Banks and Financial Institutions have been in search of a reliable, objective and comprehensive methodology for their assessing lending risks. Other Construction entities (Owners, Consultants and Contractors) also require a comprehensive, objective and reliable instrument for assessment in order to forecast the chances of success of a project. Insurance companies too will find a reliable risk assessment system very useful for designing new types of risk covers for the construction industry. Therefore development and implementation of a grading system has a direct relationship with Construction Financing. The 11th Plan Working Group for Construction had suggested that an institutionalized system of grading of Construction Companies, Contractors, Project Owners, Consultants and projects should be adopted. CIDC with ICRA has developed a comprehensive and reliable system for assessing the performance potential of all entities involved in a project. An institutionalized system of grading of Construction Companies, Contractors, Project Owners, Consultants and projects should be adopted in order to enhance the confidence of financial institutions/banks in lending for the Construction sector. The FIs/banks can quantify the risks better and may lend at more reasonable rates.

6.4.2 Construction industry-specific lending norms

Existing financial institutions and banks should adopt construction industry-specific lending norms and eligibility criteria for the borrowers from the construction sector as well as introduce special incentives or schemes. Financing construction often involves lumpy investments and hence financing requirements are of higher order. The lending institutions may not be able to comprehend all type of risks and complexities involved in a construction project. It is for that reason many lending institutions fail to evaluate projects risks and gathers bad experiences in the sector in terms of bad loans or low returns on investments. These experiences make them risk averse to construction projects and as a result the sector faces paucity of funds. It is in this context the concept of “lender’s engineer” comes in, particularly for projects where long term loans are sought for project development. What is actually needed is an engineer who could deal with the financial aspects and several others such as contractual and legal, behavioural, social, historical, banking risk assessment, establishing & insurance related aspects. This engineer could be an individual for small value projects, or a group of engineers for large value projects. This could be a firm specializing in venture management.

Employed by the lending institutions a “lender’s engineer” would oversee the operations to protect the interests of lender, and therefore would play a very important role to ensure the successful implementation of project. A “lender’s engineer” would thus ideally keep a check on the entire progress of the work, with a view to ensure that slightest impediments are immediately removed, and the work

must continue as per schedule to ensure that the lender continues receiving his returns/dues. This type of an arrangement would go a long way in catalysing flow of institutional credit to the construction sector.

6.4.3 Credit Enhancement Product/Agency

Establishment of a 'Credit Enhancement Product/Agency' would provide bridge finance to the construction sector. For the infrastructure sector, IIFCL has recently launched a Rs. 300 crores partial guarantee facility that would be availed by the developer (or companies). For construction companies a liquidity support product would be useful in case of delayed payments particularly by the government to enable timely interest payments that would provide comfort to the other lenders. This would have to be taken by the Client to give comfort to lenders. However there could be issues if the Client is not making timely payments to contractor which means the credibility of client is suspect even with the lenders/guarantors. Financial risk Coverage policy may be more useful.

A **Credit Guarantee Fund** similar to the SIDBI Credit Guarantee Fund for providing collateral free loans may be envisaged for the small construction companies that need to modernise. This would facilitate the small construction companies.

6.4.4 Setting up of a Mortgage Refinance Company

With an aim to boosting large-scale construction activities in the country, the banks may facilitate development of financing products for developer and establish a Mortgage Refinance Company for construction activities. Such a Mortgage Refinance Company would be a financial institution owned by the banks with the sole purpose of supporting banks to do construction mortgage lending by refinancing banks' mortgage portfolios. The Mission of the Company could be to source funds in the financial market as efficiently as possible and channel the same to member banks at a competitive rate. This will facilitate access to construction sector in general and housing to the urban population, while contributing to the development of capital markets.

Mortgage Refinance Company would serve as a secure source of long-term funding at attractive rates while ensuring sound lending habits among banks. This will help in reducing any maturity mismatch risk for banks and increase available loan terms. This in turn helps improve the affordability of mortgages and extends the range of qualifying borrowers, resulting in the expansion of the primary mortgage market and thus home ownership in the country. Overall the key benefits of setting up a Mortgage Refinance Company can be summarized as:

- The provision of secure long term funding at attractive rates. Lowering the cost of funds, which can lead to a lowering of mortgage rates, thereby improving affordability and extending the range of potential borrowers.
- The availability of long term fixed rates can help provide a degree of certainty, which can help the markets develop with confidence.
- Allows for greater competition in the mortgage market. The introduction of such a Company means new institutions to enter a market which was previously restricted to those with either a good credit rating or to those who had invested in a branch network and had significant deposit collection capabilities. This will therefore enable a more diversified set of lenders to develop than just like large commercial banks, and can be a driving force for competition on the primary market, another factor promoting efficiency and affordability.
- By acting as a central refinancing platform, This Company can act as a force for standardization in the market, pushing Member banks to adhere to best practice. The Company will be able to set criteria for the types of loans it will refinance, including standardized documentation, processes, risk characteristics, etc. greater transparency, allows the creation of market information systems, which in turn can lead to better risk management better market and consumer regulations and an overall lowering of the risks associated with mortgage lending.
- This Company can act as an intermediate step on the path to a full secondary mortgage market. Whether it is the lack of adequate legislation, the absence of credit bureaus or the absence of rating agencies, many countries are not able to directly make the leap from funding mortgages through short term deposits to refinancing them on secondary mortgage markets using covered bonds or securitization.
- The Company can be a tool for delivering policy objectives such as the promotion of affordable housing in particular or the promotion of construction sector in India in general.

6.4.5 Setting up of a Construction Bank

There is a need for establishment of a Construction Bank especially dedicated to suit the sector's financial needs. Countries like China, Singapore, Ethiopia have established Construction Banks. The Construction Bank can offer a wide range of consumer, retail and commercial banking products and services to customers like retail housing finance, construction finance, trade financing, deposits, working capital and term lending, foreign exchange, leasing, insurance, investment, funds advisory and electronic banking services, etc. The operational modalities of setting up of the Construction

Bank could be in the form of a Joint Venture with 51% Government share and 49% private sector stake.

6.4.6 Indian Infrastructure Equipment Bank

A major chunk of construction equipment owned by Companies remains unutilised for large parts of the year. The idle equipments require maintenance. Depreciation adds further to the unproductive costs of the Company, with the total equipment stocks of over Rs.1,35,000 crore in the country and with additional requirements of Rs.15,000 crore every year (as per CIDC estimates), efficient utilisation of construction equipment will result in huge savings to the economy. Keeping this in view, CIDC has prepared a general set of guidelines for the establishment of an Indian Infrastructure Equipment Trust Ltd.

6.4.7 Compulsory Escrow accounting for Construction Projects

An escrow is an arrangement made under contractual provisions between transacting parties, whereby an independent trusted third party receives and disburses money and/or documents for the transacting parties, with the timing of such disbursement by the third party dependent on the fulfillment of contractually-agreed conditions by the transacting parties. Escrow accounting is best known in the context of real estate (specifically in mortgages where the mortgage company establishes an escrow account to pay property tax and insurance during the term of the mortgage). Escrow accounting mechanism may be made compulsory in the construction projects of Governments in particular in order to provide credit cushion to the investors. It would also be beneficial from the lenders perspective, as it would ensure that the funds deployed for a specific project are spent for the same and repayment of principal is also timely.

Further, a **Letter of Credit** may be opened in the name of the contractor at the time of award of project by the Client to ensure that the payment is made as soon as the project milestone approval is received.

6.4.8 Working capital advance

Working capital advance may be provided to contractors in order to kick-start the construction project. Due to recent economic slowdown, delay in payments from clients, longer execution cycles, blockage of funds in the form of retention money and margin money required for availing the non-fund based limits

and an increase in loans and advances/investments in subsidiaries, the working capital requirement for construction companies has been increasing. Moreover, given the market structure comprises mainly small contractors and the importance being placed on the development of infrastructure in the rural areas, there is an increasing need for facilitating the small contractors who would need working capital. It is suggested that for small contractors seeking working capital loan upto Rs. 10 lakhs the same may be made available as collateral-free working capital loan under the priority sector lending by Banks for contractors based on the letter of award of work. It could be included under small business / enterprises. In addition to working capital advances, regulation may be made to release the funds which are blocked in the form of retention money.

6.4.9 ‘Delayed Payment Act’ for Construction Projects

A ‘Delayed Payment Act’ may be formulated which would make it mandatory for the clients/big contractors to pay the small contractors the money along with the prevailing interest rate, the cases where contractors are not paid by the clients in time. Such kind of an Act is in place for Small Scale Industries sector which has a provision to charge penal rate of interest on outstanding payments if the same are delayed beyond the agreed or stipulated period of time. If a ‘delayed payment Act’ is formulated, It is expected to relieve the construction industries from shortage of working capital arising due to delayed payment against supplies made by them and will go a long way in alleviating the cash flow problems and provide a bulwark against bullying tactics of the big industry and protect the interests of the small contractors.

6.4.10 Lending and Non-Performing Assets (NPA) norms for construction sector may be reviewed and reformed.

6.4.11 Sector-specific (e.g. housing, real estate, Power, Roads, Ports, etc.) innovative financing instruments may be developed to enhance the flow of funds to the specific sectors. Innovative financing instruments/products like ‘Insurance Product’, ‘Housing Warranty’ and ‘green construction finance’ (and green rating other than LEED & GRIHA) may be explored for enhanced and orderly flow of institutional credit to the construction sector. The possible credit enablement mechanisms/financial instruments for affordable housing are given the Box-1.

BOX-1: Financing Instruments for Affordable Housing

1. **State Budgetary support** will have to be increased for affordable housing.
2. Credit enhancement mechanisms like Setting up of '**Credit Risk Guarantee Fund**' need to be expedited.
3. Dedicated fund for affordable housing and slum upgradation (e.g. **Urban Poor Fund or National Shelter & Livelihood Fund**) need to be created for financing affordable housing including slum housing programmes. Resources can be pooled to this Fund through contributions from Federal/State/Local Governments, HFCs, Banks, Financial Institutions/ Corporate Bodies, levy of labour cess / slum upgradation cess/ service tax on construction; and Multi-lateral/bi-lateral bodies.
4. There is a need to look at workable models for Social Rental housing which can be driven through private sector with conducive legal/regulatory environment. In this context, the options of issuing '**Rental Housing Voucher**' may be explored.
5. Set up Apex Institution by Govt of India for Financing/re-financing **Housing Micro finance** by MFIs.
6. Banks may be mandated to earmark certain percentage of **Banking Sector Fund** for Affordable Housing under priority sector lending.
7. Banks lending for affordable housing upto certain limit should be provided with **1% of the loan amount as incentive for covering their operational costs**.
8. Banks/HFCs may be permitted to **float tax-free infrastructure bonds** to raise cheaper funds and reserve for affordable housing so that they can reduce the lending rates for EWS/LIG housing loans.
9. Interest Subsidy may be enhanced and targeted for affordable housing. Other Subsidy methods like **interest-cum-capital subsidy** may also be worked out.
10. Incentives to private builders for creation of affordable/ rental housing stock through appropriate tax incentives, low cost credit and other incentives like **additional FAR/FSI/TDR**, etc. may be provided
11. **Pre-finance and start-up capital** may be provided to NGOs /CBOs for taking up affordable

6.4.11.1 Developing Housing Warranty Scheme

Housing Warranty Scheme, being offered to the consumers in the Developed Countries, (e.g. Japan, North America etc.), could be a potent instrument for covering risk elements at micro level for houses and buildings/structures. At micro level a property has several risks such as: a) whether it is free of encumbrances, b) What would be the longevity of the finishes and also the structure with and without the “routine repairs” c) What would happen to the investment, if the builder / contractor, abandons the work in an incomplete state, due to insolvency or any other extraneous reason?

A Housing Warranty Scheme would seek to mitigate such type of risks. The scheme, if introduced would benefit both the consumers and the Financial Institution for the new houses (both detached and attached houses) and also the property in secondary housing market, which presently is bereft of any support system. The scheme would have the following elements i) To provide a limited term defect warranty for the built houses and to set up and create a fund for the defect warranty for the houses constructed by small and medium sized builders who are rated, ii) To provide completion warranty programme for covering the risks arising out of bankruptcy of builders / contractors before completion of houses and to facilitate completion of the house with minimal additional cost to the buyer, iii) The Warranty Scheme for Houses shall provide a long-term warranty for quality and performance of housing with the maximum of 10 years, which would incorporate an insurance system to reinforce the defect warranty liability and shall establish a housing performance indication system. iv) As a part of this scheme, a Fund for Defect Warranty may be created.

6.4.11.2 Developing Insurance Products to mitigate construction business risks

The construction business poses a number of risks at various stages. These risks elements need to be covered appropriately by designing appropriate risk mitigation products. Specific tailor-made insurance products need to be designed for construction sector. The possible products are outlined below:

a) Bidding Indemnity Policy(BIP)- Under BIP, a contractor is insured for an established SR(Success Ratio) and variations positive or negative are reimbursed to or become payable by the contractor. The instrument if offered would help the construction companies to moderate

their quoted price for a particular bid, allow the competent players to participate in business, thereby reducing the erratic bids which are one of the major reasons for contractual disputes resulting in time and cost overruns.

b) Delay in meeting obligation by client policy (DIMO Policy)- As indemnities, the contractor furnishes to the client Bank Guarantees (Earnest Money, Security Deposit, Performance guarantee, guarantee for advances). It has been observed that the clients, at times do not i) Pay the agreed dues in time ,ii) Return / Refund the indemnities thus accepted and iii) Meet other contractual obligations. In all the cases, both the contractors and the Bankers are sufferers. A Policy to cover such risks would be a welcome step.

c) Settlement of Claims Policy (SOC Policy)- During the tenancy of contracts, there arise a number of contractual claims. Delay in payments against these affect Cash flows and hence productivity. Indemnity, by way of ensuring justified payments, to the agency, whether from client or from Bankers as advance to the client, needs to be provided, until final reconciliation. SOC Policy is meant for such an eventuality.

d) Loss of Profit Policy (LOP Policy)- A construction company draws the cash flows & designs the profits on the basis of assessment of risks and other related exigencies. Realization of profits, in reality, is dependent on unforeseeable circumstances, however statistically established is terms of percentage of the value of business. Variations can be insured and thus the profits insured.

e) Transit Insurance Policy (TI Policy)- This could be on the lines of similar instruments already available with Insurance companies. The present policies cover the risks related to the damage of the equipment and do not cater to the consequential losses such as productivity losses.

f) Loss of Performance of Construction Equipment (LOPCE Policy)-Due to defective manufacturing or lack of effective maintenance systems, contractor faces losses on account of idle equipment. Loss in performance and erosion of efficiency of equipment may also be due to any other reason including natural calamity. Cover is needed for such eventuality.

g) Force Majeure Loss Policy (FML Policy)-An instrument should be designed to cover the loss to the contractors due to termination of the contract on account of application of “*force majeure*” clause.

h) Financial Risk Coverage Policy (FRC Policy)- It is an insurance instrument to cover the risks undertaken by the financiers for extending assistance to the construction industry related borrowers, which would enable them to come forward for full support to the contractors or to participate in the construction industry business. This should also cover the risk for non/delay in

making payment on agreed dues and non-meeting of other contractual obligations by the contractors.

6.4.12 Fiscal incentives

Financial Institutions may be incentivised through fiscal incentives for lending to the construction sector by allowing resource mobilisation through tax-free bonds. Fiscal incentives to suppliers of construction materials and developers of the construction projects may be given to bring down construction costs. For example, all taxes paid (including VAT) for construction inputs for affordable housing may be reimbursed in the form of subsidy for builders to be passed on to the beneficiaries. Similarly, 100 per cent depreciation on capital expenditure on construction equipments for affordable housing may be allowed.

6.4.13 Uniformity in Tax Code

It is suggested that Uniformity in Tax Code should be adopted for all construction projects. Central Board of Direct Tax (CBDT) should have a consultative process to put up tax proposals on construction sector while deciding taxation on construction activity.

6.4.14 Workers welfare Schemes

Workers welfare activities should be taken up in right spirit and schemes like **Rashtriya Swasthya Bima Yojana (RSBY)** for construction workers may be implemented properly with the active participation of the industry.

6.4.15 Results Framework Document (RFD)

Results Framework Document (RFD) may be required for construction sector which will outline the mandate for the sector and the action plan for implementing the mandate. This document would contain not only the agreed objectives, policies, programs and projects but also success indicators and targets to measure progress in implementing them. The RFD seeks to address three basic questions: (a) What are department's main objectives for the year? (b) What actions are proposed to achieve these objectives? (c) How would someone know at the end of the year

the degree of progress made in implementing these actions? That is, what are the relevant success indicators and their targets? The well-formulated RFD will ensure dedicated flow of institutional credit to the construction sector because of the clarify enshrined in the RFD.

6.4.16 Accessing International Financial Markets

Assistance may be extended to firms in construction sector in obtaining adequate financing through strengthening of domestic banking sector, and support to firms in tapping international financial markets. Liberal guidelines for accessing international capital market through External Commercial Borrowings (ECB), Infrastructure Debt Funds (IDFs), Global Depository Ratios (GDR) and other debt instruments may be devised for firms in construction sector to access foreign funds for construction sector. Funds from multi-lateral/ bi-lateral agencies can be access by the firms involved in the construction sector.

6.4.16.1 Infrastructure Debt Funds (IDFs)

Infrastructure Debt Funds (IDFs) are expected to accelerate and enhance the flow of long term debt in infrastructure projects for funding the infrastructure investment requirements of USD 1 trillion (as per 12th plan estimates) which would require foreign investments – debt and equity - on a very large scale. The estimated shortfall in debt is approximately USD 280 billion at a conservative estimate. Currently despite it being an attractive option for the offshore investors, most foreign investors do not invest in corporate bonds. Current estimates suggest that the foreign investors hold approximately USD 21 billion worth of bonds (both gilts and corporate paper) of which not more than USD 11 billion is in corporate bonds. That too in bonds where there are no restrictions in tenure/duration of holding. Typically, Foreign Institutional Investors (FIIs) prefer to put their money in short-term paper and infrastructure bonds, which need to have a residual maturity of five years and are subject to a limit of USD 25 billion, are restrictive. The government would need to take steps to deepen the corporate bond market to make it attractive for these investors. IDF is one such instrument that is envisaged to help in creating a vibrant bond market.

IDFs provide additional benefits of bringing about financial reforms through correcting the asset liability mismatch in the financial system. India is soon likely to face a financial crunch vis-à-vis the equity and debt extended particularly as banks are reaching their exposure limits and on

account of the asset liability mismatch. It is expected that the IDF would accomplish two key aspects:

- a. Provide long term debt to the project level SPVs; and
- b. Free the capital of domestic banks and Financial Institutions to pursue Greenfield projects.

IDFs would largely help the Project SPVs in accessing refinancing from long term investors and the construction companies which sponsor these projects can be assisted. IDF would raise long term loans from sources like pension funds and insurance companies (foreign and domestic).

6.4.16.2 Foreign Private Equity and Venture Capital Funds

Indian promoters have preferred to raise capital using a combination of debt and IPOs, but these modes have their limitations. There is a need to promote foreign PE and VC funds as well as long term domestic funds for VC. For the small companies and mid-sized contractors and developers to grow and expand their operations, a Venture Capital Fund is highly recommended. LIC has launched such a Venture Capital Fund for the Real Estate and Urban sector. Banks and Non-Banking Financial Companies (NBFCs) may be advised to set up similar Venture Capital Funds.

Over the last five years, PE funds have invested approximately US\$13 billion, equivalent to one-fourth of the total capital flows to India, into the infrastructure sector. PE funds mainly invest in construction companies at the holding company level or through holding company at a sectoral level than in individual infrastructure projects as they have more certain short-term margins and cash flows. The power sector has attracted the most interest from PE investors, increasing to 45 per cent of total investments. Telecom infrastructure has become the next biggest target for PE investment. Road sector too attracts PE investments. Water, wastewater and storage projects have seen a few deals. Ports and water sector remain promising. More than 82 per cent of PE-backed deals in the last five years have involved stakes under 25 per cent, and only 5 per cent have involved stakes greater than 50 per cent. Deal size will remain small—mostly in the US\$20 million to US\$30 million range—and acquisitions will be limited to minority stakes.

6.4.16.3 Regulatory reforms required for PE and VC

To facilitate PE and VC fulfilling their role as growth enablers, a host of regulatory changes will be needed to remove ambiguities about their treatment under Indian securities and tax laws. That requires policymakers to begin by recognising the importance of PE as a distinctive asset class with unique benefits and immense potential to propel growth. Three regulatory changes required

are: First, PE and VC funds should be allowed to purchase at least 25 per cent of the capital of companies they target for investment without triggering an open offer. Under current law the threshold is set at just 15 per cent. Moreover, promoters should be permitted to share financial data about their companies with prospective qualified PE bidders, enabling the PE investors to conduct a thorough, well-informed due-diligence process and more accurately identify value-creation opportunities. A second set of rule changes that would vastly expand the pools of capital available for PE and VC investment would be to ease restrictions that bar deep-pocketed domestic institutional investors, such as pension funds, from investing in PE and VC. Additionally, removing barriers that limit insurance company investments only to funds that focus on infrastructure would draw more capital into PE and VC as an asset class. The Insurance Regulatory and Development Authority has recently circulated a proposal that would allow insurers to increase the proportion of their portfolio holdings they could invest in PE and VC funds, but only for those operating in the infrastructure space. Pension funds are prohibited from PE and VC entirely. Steps that would progressively allow them to participate would not only help mobilise capital but should enable the institutional investors better to diversify their portfolios and increase their returns. Tax simplification, in particular the broad reinstatement of straight pass-through of investment earnings, is a third regulatory reform that would make a significant difference.

6.4.16.4 Further, government may provide listing support to the construction companies seeking to list overseas to raise equity.

6.4.17 Incentivising Builders, Real Estate Developers/Corporates

Builders, Real Estate Developers/Corporates involved in construction sector may be incentivized, to take up affordable housing construction, through granting of additional FAR/FSI/TDR and appropriate fiscal incentives.

6.4.18 State Plan Document should have a Chapter on construction sector which would clearly mention the construction financing requirements in the state.

6.4.19 Single Window Clearance

In order to reduce the hassles and delays in the approval process resulting in delay in completion of projects, it is suggested that Single Window Clearance may be provided to the construction projects to avoid time and cost over-run. One of the major problems faced by the contractors pertains to land acquisition and other approvals. The government is in the process of finalising the new Act and enclosed note provides certain issues that need to be addressed urgently.

6.5.0 Way Forward

1. This is to reaffirm the significance of the flow of Institutional finance to the construction sector in the wake of massive investment requirement for the sector.
2. Obviously, such a vast financial requirement cannot be addressed by a single enterprise or institution and requires focused initiatives by the government in coordination with all the constituents of construction industry for dedicated flow of credit to the sector.
3. It is suggested that workable Action Plans incorporating the recommendation made earlier in this sub chapter may be formulated to augment resources through various strategies, as outlined above, from the institutions for the construction sector.

Chapter 7.0

QUALITY STANDARDS & ENVIRONMENT ISSUE FOR CONSTRUCTION SECTOR

7.0 Technology

The present state of Construction Industry suffers from the poor state of technology. This aspect has been the one of the most debated topics in the Construction Industry. Various committees and experts have given many recommendations, as listed in the annexure but unfortunately technology in Construction Industry in India remains lagging behind in comparison to other countries and also to various sectors in the Indian economy itself. It is important that National Strategy and policy framework focused on productivity enhancement of construction industry lays emphasis and include facilitating measures for induction of new technology, materials and construction systems and materials based on waste recycling need to be increasingly promoted. In order to reduce cost of works in rural roads sector, it is important to develop and use “marginal materials” instead of traditional costly materials.

Inefficiencies, wastage and low value added arise at two fronts, technology of construction material manufacturing and technology of construction itself.

- Many of the construction materials required are manufactured in the unorganized sector and due to the widespread nature of these materials, which are highly localized, the task of effective monitoring and regulation also become difficult.
- Low technological level of Construction Industry leads to low value addition and low productivity alongwith poor or sub-standard quality coupled with time over runs. This in turn leads to continued high labour intensity levels and low mechanization.
- Demand for high technical and high value addition in the construction can only be driven by the owners of the project. Due to price sensitive owners there is no incentive for the contractor to adopt better technology of construction. Technology in most cases is owner driven.
- Research and development (R&D) in the construction should be seen as a continuing activity, as the scientific and technological advancements are needed to strengthen and raise the technological base of the construction industry. Recognizing Research and Development as a continuing activity Government should provide adequate financial

support for R&D to the National institutions engaged in scientific research and provide incentives for private sector players to undertake in-house R&D.

Also, low technology in the industry as a whole also leads to higher social and environmental costs. There is need, therefore, to adopt the life-cycle-costing approach in selection of technology for specific works.

On a comparable scale, the investment in R&D in construction technologies in India as compared to technologically advanced countries is abysmal. Following matrix highlights our stature in this area vis-à-vis the advanced Nations.

Tier 1. U.S.A. / West European Nations / Australia	-	4-6%	of	investment	in
				construction	
Tier 2. Central European / S.E. Asian Countries	-	1.5-2%	of	investment	
				in construction	
Tier 3. Asian Countries (SAARC Region)	-	0.03-0.05%		of	
				investment	in
				construction.	

Source : (Asia Construct 2003 Report)

It is note worthy to mention that, much of the investment in case of tier 3 Nations is Government Sponsored, majority of which goes to equip & furnish Educational Institutions.

Industry seldom invests in R&D since no tangible returns are perceived to be availed and no incentives are offered.

It is therefore proposed, that a National Construction Research & Development fund be created and an authority be constituted under the auspices of DSIR to administer this provision. In order to fund such initiatives, a compulsory cess amounting to 5% be imposed on sanctioned budgetary amount for all public funded projects. The proceeds of this cess should be utilized for Research & Development needs

7.1 Information Technology & It's Strategic Use

Management of information in today's construction projects is one of the biggest challenges that face project teams. The need of the hour is to leverage the use of information technology to manage and solve the same issues that builders have been concerned with for centuries:

- What are we building ?
- How much will it cost ?
- When will it be done ?

Moreover, the strategic use of IT in construction can help us to address one of the major focus areas of the 12th Plan - "Enhancement of Capital".

The use of IT as a strategic tool can be applied at a five level framework of

- (1) national construction industry,
- (2) professional institution,
- (3) construction enterprise,
- (4) construction project and
- (5) construction product.

Issues surrounding the use of electronic communications affect all five levels in different ways and it would seem that the strategic and technological co-ordination of all five levels is essential for the successful use of IT for a national industry.

Due to the fact that the construction activities in the Nation, are being handled by multifarious agencies, having no cross linkages for the flow of information, its storage, and the mining for **(the sake of better planning, a National Data Base, using IT techniques, must be created).**

Presently, there is no credible and definite database, except for the information collected and culled out by few organizations such as CIDC, CSO/NSS, CPWD, BMTPC and some more. All such information must be analysed and stored for periodic upgradation with **a singular nominated Institution.** A data base development fund may also be created to meet operative expenses.

Some of the major technology application segments where IT can have a direct impact in the workings in the Construction industry are :

- IT strategies within organizations and groups, ranging from the level of the individual firm to a consortium of firms to national construction industries.
- Construction process and enterprise modeling including procurement practices.
- Reengineering of the construction process using IT as an enabling technology
- Methods of concurrent engineering
- IT-supported communication across or within disciplines and life cycle stages (hypermedia, Internet, videoconferencing etc.)
- Databases, translation methodologies, remote communication between programs, shared object libraries and other computing techniques for data exchange and sharing
- Technologies and standards for the digital representation of buildings (building product models)
- Standards for structuring and exchanging data in the construction process (building classification systems, EDI messages, CAD-layering, document management, representation of building regulations, component libraries)
- The use of IT-based techniques for problem solving in construction (expert systems and AI, case-based reasoning, simulation, neural networks, the genetic algorithm etc.)
- Computerization of building standards, codes and regulations.
- Distance learning of IT in construction engineering using IT itself.

The business processes that can be favorably impacted by IT in the operations of the construction industry, in the various stages of its operations are :

- Tendering, bidding, bid evaluation
- Grading of Construction Entities – contractor, project owner, project consultant, and the Project.
- Project execution logistics – supply chain, supervision, hiring of construction equipment, labour contracting
- Communication set-up between project site, Indian headquarters and JV partner

- Project management
- Financial accounting and reporting as required by Banks & FIs
- Collecting accurate and timely information for planning and future projections
- Making available and disseminating timely information
- Assist the Indian Construction sector to become internationally competitive

Moreover, today in India the legal infrastructure is in place to address the concerns about confidentiality and legal status of electronic communications. The recent IT Act has provision for:

- Electronic signature recognition
- Encryption
- Modification of other legislation to allow communication by electronic means

The Act may alleviate current concerns about electronic communications and thus lead to cost and time savings.

It is therefore proposed that a National Act covering these aspects for Construction Industry be enacted.

7.2. Environmental Issues

In pre-independence era India was predominantly an agrarian economy, with almost a stagnant national income. The country started the process of planning with the launching of 1st Five Year Plan in April 1951 aimed at initiating a process of development which would raise living standard and open out to the people new opportunities for a richer and more varied life. The country, over the past six decades, has traveled a long way indeed in its drive towards economic growth, modernization and globalization of economy, and self reliance in various areas of economic activity.

However, having adopted the pattern of economic development that brought prosperity to the Western countries, India has also seen widespread environmental damage and degradation in the pursuant of the economic growth. The concern for preserving the environment against the

onslaught of industrial expansion, intensification of agriculture, and the adoption of the resource-intensive lifestyle has not been given the attention it deserves, and the costs of environmental degradation have not been internalized in the development process. It is known that country is paying an enormous price for the onward march to higher economic growth, particularly in the post-liberalization period, and it has brought in its wake ecological devastation and numerous health problems.

To regulate and protect the environment a number of legislations, policies, and programme have been formulated by the Government. Some of the important ones are; Air (prevention and Control of Pollution) Act 1981 and Environment (Protection) Act, 1986. Following these legislative steps were the policy statement on abatement of pollution in 1992 and Environment Action Programme in 1993. The Environment (Protection) Act sets out the parameters under which the Ministry of Environment and Forests operates to formulate environmental policy at the national level. This act is an umbrella legislation providing a single focus in the country for the protection of environment and seeks to plug the loopholes in the earlier legislation.

- Guideline for Setting and Environmental Impact Assessment

From the point of view of the construction industry setting of projects is an important aspect. In setting the projects, care should be taken to minimize the possible adverse effects on the environment and quality of life. Several construction projects are many a times proposed to be located where sub-soil water levels could be very low and acute shortage of water may adversely affect the long term performance of the project. Similarly some of the industries relating to manufacturing of building materials should not be located near the populated neighborhoods, because the emissions from such industries may badly affect the quality of life in the vicinity.

Environmental impact assessment (EIA) is recognized as an important tool for integrating the objectives of environmental management with the requirements of economic growth and social development. In reorganization of the role the EIA could play, investment decisions and selection of sites for projects in different sectors are approved or rejected by the Government on the basis of EIA. The 29 projects listed in Schedule I of the EIA notification can be broadly categorized (Min. of E & F. 1994) under the following sectors (many of which related to

construction sector), industries, mining, thermal power plants, river valley projects, ports, harbours, and airports, communication, atomic energy, transport (rail, road and highways) and tourism (including hotels and beach resorts.)

As per notification published on 14th September 2006 in the Gazette of India, Extraordinary Part II and Section 3, Sub-section (ii), Ministry of Environment and Forests has directed that from the date of its publication the required construction of new projects or activities or the expansion or modernization of existing project or activities listed in the schedule **Anexure** - - to this notification entailing capacity addition with change in process and or technology shall be undertaken only after the prior environmental clearance from the Central Government or as the case may be, by the State Level Environment Impact Assessment Authority duly constituted by the Central Government .

The detailed notification of 14th September 2006 provide the guidelines for approval by the Central Government and State Level Assessment Authorities (SEIAA) based on the Environmental Impact Assessment and categorization of projects and activities including relating to construction requiring approvals by Government of India and SEIAA.

Most of the provisions related to EIA in vogue in the countries, who are the signatories of Kyoto Protocol, are governed by the protocol stipulation suiting the local exigencies. Protocol details are appended. In many countries where Environmental Laws have been enacted. All projects over a certain size are automatically required to conduct studies, provide estimates, and perform at their own expense, EIA for their projects before initiating activities on ground. The new law for example in Japan marks a watershed in the history of environmental conservation because it requires that the assessment procedures include mechanisms for ensuring that the views of local residents, inter alia, are reflected in the assessment. Like this many other counties have already enacted key environmental legislation keeping EIA a pre-condition before construction projects beyond stipulated size are approved.

Need for Integrating Engineering with Environmental Issues

In view of the rising environmental concerns, the ultimate challenge lies in linking the best understanding of environmental issues with global or national policy and action at local level. It is therefore necessary that concerned organizations facilitate the process of interaction between decision makers and industry representatives and professionals concerned with planning, design, and implementation of projects. From the point of view of the construction industry following areas are important for engineering attention:

- Management of water resources and amelioration of water pollution.
- The rapid growth of cities particularly with respect to the impact of natural disasters, air pollution and engineering infrastructure available in the fast growing cities.
- Efficient use of materials and energy
- Environmental management during implementation phase and post completion phase.
- Technology transfer, and identification and delivery to the concerned entities/enterprises.

In view of the above the need for stake holders of the construction industry is to play a much larger role in making responsible contribution to the formation of public policy about technology, human resource development, and creating awareness about sustainable development.

7.3 Quality

Quality in construction works is one of the biggest casualties for which there are number of reasons, such as lack of incentives for inducting new technology, lack of pre-qualification requirements for trained and certified workmen, lack of appreciation for life cycle costing approach, lack of R&D and multi-source taxation which causes opacity and adds to overall cost of procurement eventually leading to hinderence in adoption of new technologies. It is therefore important that to make Indian Construction Industry more competitive all issues relating to enhanced quality in construction products are given serious attention at all levels.

In recent years, some companies have been striving to elevate their technological capabilities by actively supporting training and certification levels for skilled workers, supervisors, managers and by sharing construction techniques (like Ready Mixed Concrete, pre-fab techniques) which use information technology.

At the national level CIDC has initiated a skilled upgradation programme through Training & Certification. This system comprises skill training and assessment for 47 types of Construction related trades and workers are assigned to a skill level based on their ability to pass through both written and hand-on evaluation. This programme is helping many medium-sized and even large-sized and specialized construction companies who can not efficiently implement their own in-house scheme / training programme.

Yet another development, aimed at enhancing Quality in Construction Works, that is taking place is that Construction Companies are working to obtain ISO 9000 series certification and number of such companies has risen in recent years. Many large size general Contracting Companies in private sector and most in public sector have obtained the status and certification.

Lately Bureau of Indian Standards has started formulating performance standards for special jobs requiring high quality level. These Performance Standards will gradually supercede Prescriptive Standards. The Construction entities and procurement agencies are also gradually realizing the importance and the role that adherence to Performance Standards both in inviting tenders and implementation can contribute. Such initiatives will certainly help in enhancing quality of construction works. The benefit of shifting to performance based specifications has been already demonstrated by increasingly adopting use of Ready Mixed Concrete (RMC) in large number of Construction Projects. To ensure achieving Quality in building and Construction Works following two schemes followed in Singapore and United Kingdom deserves attention by Indian Construction Industry. As for the Agreement Certification System, the BMTPC (Min. of Urban Affairs & Poverty Alleviation) and CIDC are already engaged in the Performance Appraisal Certification Scheme (PACS) for evaluation of performance of Construction products and systems for past several years. However the details of both the schemes (Singapore and UK) are given below.

Singapore has introduced a scheme CONQUAS for enhancing quality aspects of building and housing which merits attention by Indian Construction Industry.

Construction Quality Assessment System (CONQUAS) as practiced in Singapore

The Construction Quality Assessment System or CONQUAS was developed by the Building and Construction Authority in co-operation with major public sector agencies and various leading industry professional bodies to measure workmanship quality in a completed building. Since the launch of CONQUAS in 1989, more than 1,500 public and private building projects have been assessed by BCA. The contract value of these projects exceeded S\$50billion.

As a de facto national quality yardstick for the industry, CONQUAS has been periodically fine-tuned to keep pace with changes in technology and quality demands of more sophisticated Singaporeans.

CONQUAS was designed to:

1. Have a standard quality assessment system to benchmark quality of construction projects.
2. Measure quality of constructed works against workmanship standards and specifications.
3. Improve the quality standards of the Singapore's construction industry.

The scheme covers three main aspects of the general building works:

1. Structural works – covers the structural integrity and helps to safeguard the interest of building occupants in relation to safety.
2. Architectural works – deals with the aesthetic of the building such as finishes and components. This is the part where the quality and standard of workmanship are most visible.
3. Mechanical & Electrical (M & E) works – concerns with the performance of selected mechanical and electrical services and installations to ensure the comfort of the building occupants.

CONQUAS only assesses workmanship of completed projects. It does not cover defects that appear after the period of handover or during the defect liability period. Such defects cannot be foreseen during construction. Therefore, CONQUAS does not assess on the possibility of future defects.

Developers are using CONQUAS increasingly to promote and market their property developments. For instance, it is common for developers to specify target CONQUAS Score in the tender contracts for contractors to achieve. Similarly, contractors that are capable of delivering a consistently high CONQUAS Score would be in demand and should command a higher premium.

Agreement Certificates by British Board of Agreement – Quality appraisal Scheme in U.K.

BBA's Agreement Certificate Scheme provide authoritative and independent information on performance of building products. The main focus of the Agreement process is the evaluation of the extent to which the product allow compliance with relevant Building Regulations and other statutory requirements to be achieved.

Regulatory requirements are however, only a part of the overall Agreement procedure: Specifies in particular look for further information on many performance characteries, especially those affecting durability. Tests are carried out, either by the BBA or approved external laboratories, to ensure that a product will meet certain predetermined levels of performance in particular area.

Many of the BBA test facilities are formally accredited by the United Kingdom Accreditation Service (UKAS). The accreditation underlines the BBA's commitment to the highest levels of accuracy in the test procedures and is yet another reason why products approved by BBA can be selected with confidence by specifiers and purchasers. BBA technical staff also visits sites where products under evaluation are being installed. This enables the BBA to provide valuable information in conjunction with the manufacturer and installers on items like transportation, storage, fixing, maintenance and durability.

One important aspect of this scheme is that every Agreement Certificate gives a statement on product durability, either in years or as a factor of the anticipated life of a building in which product might be incorporated.

Under the scheme, the evaluation of the production facilities is carried out early in the assessment so that any areas of concern will be rectified at that point. The BBA expects a formal and documented quality system to be in operation of production facilities. Product manufacture

is monitored throughout the life of an Agreement Certificate, usually twice a year and more intensively at the end of each 3 year period during the formal Review procedure (which varies from 3 to 5 yrs). It is this thoroughness and rigour of examination that has helped to give the BBA and its Agreement Certificates the high reputation it holds among all those involved in selection or acceptance of building products.

The BBA's Agreement Certification Scheme has been in operation for over 40 years and over 4000 Agreement Certificates have been issued. For emerging products and technologies, BBA also can carry out Prototype Product Assessment, though this is not titled as Agreement Certificate.

CIDC has already entered into agreements with both the organizations to operationalize the effective implementation, a mandate needs to come from GOI

7.4 Standards

Bureau of Indian Standards, the Statutory and apex organization, insuring laying down of standards and their adherence, is not having any mandate for enforcement. Even the standards are recommendatory in nature, which prevents stake holders to strictly conform and follow. The issue of shifting from Prescriptive to Performance Standards need to be given high priority. Though BIS has already initiated the process in few areas. The Bureau should also ensure that all their standards (particularly relating to civil engineering) are accessible on their Website. New standards in compliance with guidelines of Govt. of India on Energy Conservation and integrating environmental issues with construction techniques on the lines of new Environment Protection Act need to be developed or revised if already existing. This in due course should lead to formulation of standards on Green and Intelligent building design and construction.

It is proposed that the BIS be granted necessary authorities and powers to ensure serious adherence to Indian standards.

7.5 Energy Issues – Green Building Technologies

Recognizing the impact of rising energy demand and importance of environmental issues on the development activities, the Government of India, soon after the energy crisis of 70s had established separate Ministries at National level for non-conventional Energy Resources and Environment and Forests. These Ministries had following focus areas:

- 1 development and promotion of alternative sources of energy for supporting sustainable development through policies and strategies for promoting concepts and technologies pertains to energy efficiency and conservation.
- 2 environmental protection by promoting green technologies and improving carrying capacity of eco-system to support national development plans

Construction sector being one of the highest consumers of energy and natural resources was expected to address the issues at environment impact and energy efficiency.

In order to facilitate implementation policies and programmes in the area of Green Construction and other issues for growth and sustainable development of construction industry the Government of India, established CIDC an apex organization under the patronage of the Planning Commission bringing all stakeholders on a common platform.

Another interdisciplinary organization Building Materials and Technology Promotion Council was set up in the Urban Development Ministry to address the issues of environment friendly and energy efficient building materials and technologies. With a view to promote green building materials, the Government of India in their successive budgets after 1993 has been providing excise duty concessions on the materials manufactured from recycling of agro-industrial wastes and by-products.

The Governments at Central and State level have set the Central Pollution Control Board and State Pollution Control Boards, to approve, monitor and regulate the projects from all sectors including construction sector for their impact of environment.

In 2001, Government of India brought out the Energy Conservation Act 2001 passed by both the houses of parliament and established a Bureau of Energy Efficiency (BEE) in pursuant to the Act to promote concepts and technologies for efficient use of energy and its conservation.

Thus from the foregoing it is seen that Government has taken several important initiatives during past two decades for development and promotion of Green Construction in order to achieve energy efficiency and increasingly greater use of eco-friendly construction technologies.

Green Construction and Materials

It is now being increasingly realized in the construction industry that sustainable development concepts, applied to the design, construction and operation of buildings, can enhance both the economic well-being and environmental health of communities. If sustainable design principles are incorporated into building projects, benefits can include resource and energy efficiency, healthy buildings and materials, ecologically and socially sensitive land use, transportation efficiency, and strengthened local economics and communities. Under National Bankers Mission, for example, the Government is funding establishment of bamboo mat-making centres and giving training to local women workers in bamboo growing areas of North-eastern States of India. These Centres are expected to supply the bamboo mats for further processing at industrial unit for production of bamboo mat corrugated sheets for roofing of buildings. This is an example, where promotion of eco-friendly construction materials and technologies are strengthening the skill up-gradation and employment generation activities, ultimately leading to economic development of local communities. This is an example where public and private partnership has generated economic and environmental benefits of green building practices.

The CIDC is now taking an initiative in collaboration with few State Governments to facilitate development of technologies and building guidelines and promoting practice of green construction. The initiative is emanating from the fact that because of construction industry's significant impact on the national economy, even modest changes that promote resource efficiency in construction and operation of buildings can make major contributions to economic prosperity and environmental improvement.

CIDC is interacting with Organizations and agencies, from other countries which are promoting concepts and technologies relating to green building materials and construction systems. The aim of CIDC's co-operation with these agencies is to create awareness in the Indian Construction sector about the fact that it is now possible to put a cost of environmental impact of construction projects and place an economic value on environmental degradation and damage. For example CIDC's proposed collaborative effort, for example, with Building Construction Authority of Singapore is to evolve a green mark for Buildings Scheme on the pattern they have developed in Singapore. This Green Marking will provide a meaningful differentiation of buildings in real estate market. It will help in bench marking a scheme which incorporates internationally recognized best practices in environmental design and performance. This can have positive effect on corporate image of developers, for leasing and improving resale value of buildings. Benefits of Green Mark Assessment include;

1. Facilitate reduction in water and energy bills
- 2 Reduce potential environmental impact
- 3 Improve indoor environmental quality for a healthy and productive work place
- 4 Provide clear directions for continual improvement.

In order to achieve above value of environmental impact, the scheme of Green Marking will assess five key areas of environment which are of global concern. These are also being used by Department of Environment for evaluating environmental impact assessment of large construction projects. These include energy efficiency, water efficiency, site development and building management, indoor environmental quality and environmental innovations.

In view of the above, it will be desirable that the construction industry develops typical green building guidelines for different geo-climatic regions and Energy Consumption Indices are developed for different types of building occupancies, site conditions, and climatic zone in which these projects are to be located. CIDC could be entrusted with this responsibility by GOI.

Recognizing the mandatory criteria as indicated in the Energy Conservation Act (ECA) 2001 and requirements laid down by Central and State Pollution Control Boards, the Construction

Industry may be advised to work in unison with Bureau of Energy Efficiency set up under the ECA 2001 to develop Green Building Guidelines, based on,

- i) Energy efficiency and use of renewable energy
- ii) Direct and indirect environmental impact
- iii) Resource Conservation and recycling, minimisation of waste and water-harvesting
- iv) Indoor environmental quality
- v) Community and site related issues.

Governments at Central, State and Local levels should also encourage use of Green Construction materials and planning and design concepts. The Government should also consider giving fiscal incentives for use of building materials produced from recycling of wastes and by-products from agricultural, forestry and industrial operations.

7.6 Good Practices Recommended & Way Forward

- Construction Processes need to be environmental friendly and Institutions and processes need to be under constant audit mode for adherence to environmental provisions.
- There is a pressing need to implement already existing standards/ norms.
- BIS, CIDC, BMTPC, may be granted specific mandate by the GOI.
- There should be singular Code (of standards) of the Construction Industry of India
- Plans need to be developed at the State Government level, articulating the needs.
- The manufacturing process of Construction Materials need to conform to the latest emission norms.
- List of authorized accreditation agencies must be notified by the Govt. of India and CIDC be made responsible to assess & make recommendations in this regard.

Chapter 8.0

R&D FOR CONSTRUCTION SECTOR

8.0 Overview

- Innovation in construction sector is essential for competitiveness and effectiveness. R&D, being a driver of innovation, is important to construction sector as to any other.
- As per UNESCO Science Report 2010, India's R&D intensity – Ratio of Gross Expenditure on R&D (GERD) to GDP – was about 0.88% in the year 2008 while China had an R&D intensity of about 1.4%. However, there has been a significant increase in the R&D intensity in the country.

Countries which have increased their GERD/GDP between 1997 and 2005

	1997	2005	Ratio
Pakistan	0.16	0.44	2.81
Tunisia	0.43	1.02	2.40
Thailand	0.10	0.23	2.31
China	0.64	1.33	2.07
Turkey	0.35	0.69	1.69
Singapore	1.48	2.30	1.55
South Africa	0.60	0.92	1.54
Iceland	1.83	2.78	1.52
Israel	3.03	4.51	1.49
Mexico	0.34	0.50	1.46
Austria	1.69	2.44	1.44
Latvia	0.39	0.56	1.43
Spain	0.80	1.13	1.41
Lithuania	0.54	0.76	1.40
Mongolia	0.19	0.26	1.38
Portugal	0.59	0.81	1.37
Czech Republic	1.08	1.41	1.31
Hungary	0.72	0.94	1.30
Mauritius	0.29	0.38	1.29
Finland	2.70	3.48	1.29
Greece	0.39	0.51	1.28
Denmark	1.92	2.45	1.27
Egypt	0.20	0.25	1.26
Canada	1.66	2.05	1.24
Republic of Korea	2.48	2.98	1.20
Japan	2.87	3.33	1.16
India	0.69	0.80	1.16
Armenia	0.19	0.21	1.15
Cuba	0.44	0.51	1.14
Slovenia	1.29	1.46	1.13
Germany	2.24	2.49	1.11
Argentina	0.42	0.46	1.10
New Zealand	1.09	1.17	1.07
Italy	1.03	1.10	1.07
Sweden	3.52	3.69	1.05
Trinidad and Tobago	0.12	0.12	1.05
Kyrgyzstan	0.19	0.20	1.02
Russian Federation	1.04	1.07	1.02
Belgium	1.83	1.86	1.01
United States	2.58	2.61	1.01

Countries whose GERD/GDP has declined in 2005 compared to 1997

	1997	2005	Ratio
Ireland	1.27	1.26	0.99
United Kingdom	1.81	1.77	0.98
Kazakhstan	0.29	0.28	0.97
France	2.19	2.11	0.96
Bulgaria	0.51	0.49	0.96
Burkina Faso	0.18	0.17	0.95
Norway	1.63	1.52	0.94
Belarus	0.73	0.68	0.93
Netherlands	1.99	1.75	0.88
Poland	0.65	0.57	0.87
Ukraine	1.19	1.03	0.86
Madagascar	0.22	0.18	0.80
Panama	0.32	0.25	0.77
Romania	0.58	0.41	0.71
Colombia	0.27	0.18	0.67
Macedonia	0.38	0.25	0.65
Azerbaijan	0.37	0.22	0.60
Georgia	0.34	0.18	0.52
Republic of Moldova	0.81	0.40	0.49
Serbia	0.85	0.42	0.49
Slovakia	1.07	0.51	0.48
Kuwait	0.21	0.10	0.47

- As per the Global Innovation Index 2011 published by INSEAD in partnership with CII amongst others, India ranks at 87th place in a list of 125 countries globally and at 1st rank in South Asia.
- Significant changes are taking place in the global innovation landscape which are related to geography, understanding of its complex nature and the need for collaboration and openness.
- Recognising the vital role of innovation in India's development and economic growth, President of India has declared this decade as the 'decade of innovation' with a focus on inclusive growth.

- Approach to 12th Plan, underlines the following approach to innovation in Indian context:
 - Finding affordable solutions for the needs of people without compromising quality.
 - Optimum framework that delivers to people the benefits of technology that may be developed in scientific laboratories.
 - Innovations in the process of innovation itself to reduce the cost of developing the innovations.
- The new paradigm of innovation, focuses on producing ‘frugal’ cost solutions with ‘frugal’ cost of innovation; innovations that benefit people, especially the poor.
- A modern and efficient infrastructure encourages increase in productivity of any organisation as well as of an individual. Innovation in construction industry thus is crucial for delivering a cost effective built environment covering residential, commercial, industrial, institutional and public works.
- The built environment also has a major impact on sustainability, viz.:
 - Rate at which we use resources
 - Carbon footprint
 - Water consumption
 - Generation of waste
 - Raw material usage

Construction industry offers a vast potential for innovation both for sustained and sustainable growth.

- Construction industry cannot be visualized as a single industry in view of the wide range of types and sizes of construction works. It covers a spectrum of activities carried out by a group of linked organisations providing design and engineering, supplying materials and equipment, carrying out construction work and providing operation and maintenance services.
- Construction industry can be broadly classified into two sectors i.e. organized and unorganized. The organized sector includes more than 30,000 organisations whereas the standalone contractors in the unorganized sector number more than 120,000.

- Given such a diverse nature, the general perception is that the construction sector is not research oriented. While it is true that small organisations may not have adequate funds to create their own infrastructure, the real success lies unseen since construction R&D lacks a structured framework for capturing and sharing of learnings.
- R&D in construction sector needs to be built around a vision of delivering inclusive growth supported by collaboration between the research providers and the research users. There are many enterprises across the country which deliver benefits through innovation. Scaling of the impact of such innovations continuously and consistently requires a robust mechanism for information sharing and dissemination.

8.1 R&D Infrastructure

In the field of construction sector in India, the institutions doing continuous and significant amount of developmental work include Construction Industry Development Council (CIDC), Central Building Research Institute (CBRI), Building Materials and Technology Promotion Council (BMTPC), Institute of Steel Development & Growth (INS DAG), Central Institute of Plastics Engineering & Technology (CIPET), National Council for Cement and Building Materials (NCB), Central Road Research Institute (CRRI) and Research Designs and Standards Organisation (RDSO) amongst others.

8.1.1 Construction Industry Development Council (CIDC)

The Planning Commission jointly with the Indian construction industry has set up Construction Industry Development Council (CIDC) in 1996 to take up activities for the development of the Indian construction industry.

The Council provides the impetus and the organisational infrastructure to raise quality levels across the industry. This helps to secure wider appreciation of the interests of construction business by the government, industry and poor groups in society.

The Council has taken several initiatives for the development of the industry such as:

- Advice the Government on policy formulation related to construction industry.
- Standardization of construction contracts and procedures.
- Training manpower at skilled worker level and construction management level.
- Grading of construction entities
- Devise mechanisms for workers' welfare.
- Create an environment that ensures equality of opportunity for all Indian contractors.
- Help evolve policies for financing.
- Help the industry move from the current state of rule-bound, lowest-price-based contracting to a more quality-conscious, time-bound & technology-driven one.
- Dispute Resolution in Construction Contracts.
- Establishing construction equipment bank.

- Interaction and networking with international organisations to promote emerging technologies and best practices.

8.1.2 Central Building Research Institute (CBRI)

The Central Building Research Institute, Roorkee, has been vested with the responsibility of generating, cultivating and promoting building science and technology in the service of the country.

Since its inception in 1947, the Institute has been assisting the building construction and building material industries in finding timely, appropriate and economical solutions to the problems of materials, rural and urban housing, energy conservation, efficiency, fire hazards, structural and foundation problems and disaster mitigation.

CBRI carries out applied and basic research in all areas of building science to solve problems confronting the country in:

- Shelter planning
- Building materials
- Structures and Foundations
- Disaster mitigation including Fire Engineering
- To develop new technologies for the promotion of building materials and systems
- To disseminate the results of results of research far and wide for the good of community
- To transfer the developed technologies to the industry for further commercialization

8.1.3 Building Materials and Technology Promotion Council (BMTPC)

In order to bridge the gap between research and development and large scale application of new building material technologies, the erstwhile Ministry of Urban Development, Government of India, had established the BMTPC in July 1990.

The Council strives to package proven innovative technologies for the benefit of entrepreneurs interested in setting up manufacturing units in tiny, small, medium and large scale sectors.

There has been a demand for setting up such an apex institution in order to provide an interdisciplinary platform to various agencies under Central and State Governments and the private sector for scaling up proven technologies to enhance their wide-spread use and for assisting commercial production as well as systematic dissemination of appropriate technology for the benefit of the construction of appropriate technology for the benefit of the construction agencies and different sections of the population.

The Council is structured to undertake the task of the extension and application of technologies and materials developed by research institutions on the ground with the backing of financial institutions and enabling regulatory environment. To draw upon the experience and expertise in the area of building materials technology, eminent technologists, professionals of the public

sector construction agencies, the corporate sector, R & D and standardisation organisations are also associated with BMTPC.

BMTPC strives:

- To promote development, production, standardisation and large-scale application of cost-effective innovative building materials and construction technologies in housing and building sector.
- To promote new waste-based building materials and components through technical support and encouraging entrepreneurs to set up production units in urban and rural regions.
- To develop and promote methodologies and technologies for natural disaster mitigation & management and retrofitting/ reconstruction of buildings including disaster resistant design and planning practices in human settlements.
- To provide S & T services to professionals, construction agencies and entrepreneurs in selection, evaluation, upscaling, design engineering, skill-upgradation, and marketing for technology transfer, from lab to land, in the area of building materials and construction.

8.1.4 Institute of Steel Development & Growth (INSDAG)

INSDAG has been established with a view to popularize steel construction in India. The institute is a nonprofit organization having more than 600 members comprising organization, institution, associations and professionals.

The Institute primarily works towards the development of technology in steel usage and market for the steel fraternity.

Some of its roles are:

- Creating awareness amongst potential users about affordability and benefits of steel.
- Providing prompt advisory service on materials, construction practices, interpretation of codes etc. and creating an environment for better usage of steel by acquiring and disseminating knowledge about the best practices.
- Upgrading the skills of the work force by organizing refresher courses/ training programmers and offering better technical know-how, design aids and teaching aids.
- Upgrading the skills of the work force by organizing refresher courses/ training programmers and offering better technical know-how, design aids and teaching aids.
- Communicating the benefits of steel vis-a-vis other competitive materials, through life cycle cost studies, where required.

8.1.5 Central Institute of Plastics Engineering & Technology (CIPET)

Central Institute of Plastics Engineering & Technology (CIPET), Chennai, Tamil Nadu is a premier institution devoted to manpower training and technical services to the plastics and allied industries.

R&D Projects undertaken by CIPET include:

- Development of mechanically and thermally stable biodegradable plastic composites.
- Development of High Performance Thermoplastics & Thermosetting Nano-composites.
- Development of polyolefin based Nano-composites.

8.1.6 National Council for Cement and Building Materials (NCB)

Established in 1962, as Cement Research Institute of India and redesignated as National Council for Cement and Building Materials in April 1985, NCB is an apex body dedicated to continuous research, technology development and transfer, education and industrial services for the cement and building material industries. The entire range of services of NCB is delivered through its units in Ballabgarh and Hyderabad. The main laboratories of the Council are located at Ballabgarh.

National Council for Cement and Building Materials (NCB) supports Cement, Building Materials and Allied Areas and covers:

- Research
- Technology Development and Transfer
- Education
- Industrial Services

NCB strives:

- To enhance quality, productivity and cost-effectiveness
- To improve the management of materials, energy and environmental resources.
- To develop competency and productivity in human resources.
- To develop technologies for durable infrastructure and affordable housing

8.1.7 Central Road Research Institute (CRRI)

Central Road Research Institute (CRRI), a premier national laboratory established in 1948, a constituent of Council of Scientific and Industrial Research (CSIR) is engaged in carrying out research and development projects on design, construction and maintenance of roads and runways, traffic and transportation planning of mega and medium cities, management of roads in different terrains, improvement of marginal materials, utilization of industrial waste in road construction, landslide control, ground improvements environmental pollution, road traffic safety and analysis & design, wind, fatigue, corrosion studies, performance monitoring/evaluation, service life assessment and rehabilitation of highway & railway bridges. The institute provides technical and consultancy services to various user organizations in India and abroad.

For capacity building of human resources in the area of highway engineering to undertake and execute roads and runway projects, Institute has the competence to organize National & International Training Programmes continuing education courses since 1962 to disseminate the R&D finding to the masses. R&D areas include:

- Traffic Engineering & Transportation Planning (Traffic Engineering & Safety, Transportation Planning and Transport Environment).
- Pavement Engineering and Materials (Flexible Pavement, Rigid Pavement and Pavement Evaluation).
- Geotechnical Engineering (Ground Improvement and Landslide Investigations).
- Road Development Planning and Management (GIS based network planning, master plan for rural roads).
- Bridges and Structures (Bridge design, investigation, instrumentation and rehabilitation measures).

8.1.8 Research Designs and Standards Organisation (RDSO)

With increased demand of rail transportation, erstwhile Central Standards Office (CSO) and the Railway Testing and Research Centre (RTRC) were integrated into a single unit named Research Designs and Standards Organisation (RDSO) in 1957, under Ministry of Railways at Lucknow.

RDSO functions as the technical advisor to Railway Board/Zonal Railways and Production Units and performs the following important functions:

- **Development of new and improved designs**
- Development, adoption, absorption of new technology for use on Indian Railways.
- Development of standards for materials and products specially needed by Indian Railways.
- Technical investigation, statutory clearances, testing and providing consultancy services.
- Inspection of critical and safety items of rolling stock, locomotives, signaling & telecommunication equipment and track components.
- RDSO multifarious activities have also attracted attention of railway and non-railway organisations in India and abroad.

RDSO has a number of laboratories which are well equipped with research and testing facilities for development, testing and design evaluation of various railway related equipments and materials.

Board of Board of Railway Research (CBRR) consist of Railway officials and Non- Railways members - eminent scientists, technologists, engineers and senior executives of other research organizations, academic institutions and industrial units related to railway technology and materials. Functions of CBRR are:

- To consider and recommend the programme of research on Indian Railways.
- To review the research programme from time to time.
- To ensure coordination and assistance from other research laboratories.
- To review the ongoing projects from the technical angle.

8.2.0 R&D Vision and Strategy

- Keeping in view the diverse and fragmented nature of Construction Industry, a holistic approach is essential in developing a long term vision and implementation of R&D projects for the Construction Industry. The research strategy needs to be credible and coherent both for the research providers and research users to ensure adequate flow of funds.
- Assets that will be built a few years into the future may be radically different in their design and construction in view of the sustainability concerns. At the same time, the existing buildings and infrastructure assets would still be in use and shall require refurbishment. Accordingly, R&D works may focus on immediate goals of cost reduction, resource conservation, improvement in quality and safety along with the pioneering innovations which can bring about paradigm shift in material and processes. Key improvements are expected in areas relating to energy, water, biodiversity and waste management. R&D focus thus would galvanize and accelerate imbibing good practices and new technologies.
- R&D vision shall motivate towards an innovative sustainable and productive construction industry and shall ensure collaboration and alignment amongst policy makers and all sections of the construction industry supply chain. A clear objective and identification of well defined research projects would accelerate development of an innovative mind-set and in time should cause users to demand change.
- Comprehensive approach to Research and Development shall cover:
 - User requirements.
 - Design and engineering of better assets which are sustainable and environmental-friendly.
 - Construction of assets which conserve energy and water resources and are easy to operate, maintain and deconstruct.
 - Improved materials with optimum use of raw materials and with emphasis on recycling of resources.
 - Construction techniques and methodologies which promote safety and biodiversity.
 - Minimizing waste generation and environmental friendly waste management.
 - Effective communication and validation procedures.

- Innovations in Economics and Management of Construction Sector.
- Processes and systems to ensure wide reach of benefits for urban as well as rural sectors.
- Integrate the research in construction of infrastructure development with the national employment programmes such as National Rural Employment Guarantee Act (NREGA) and Sampoorna Grameen Rozgar Yojna (SGRY).
- Promoting collaboration amongst policy makers, research institutions, academic institutions and construction industry.

8.3.0 Thrust Areas

- The challenge for the construction industry in the coming years is to establish a framework which supports innovation, research, development, demonstration and use of knowledge for benefits to society at large. Such a framework would be built around:
 - Integration of various technologies into viable assets.
 - Develop designs and practices for meeting the needs of climate control.
 - Develop new materials and construction techniques.
 - Asset management deploying ICT right from conceptualization to deconstruction.
 - Automation in design, construction and operation.
 - Risk reduction/mitigation.
- Designers, constructors, suppliers and asset users are required to work as a team in a collaborative environment to improve the overall delivery process which will lead to innovation and learning.

8.3.1 Design and Engineering

- Infrastructure design in principle should support the triple bottom line i.e. environmental, social and economic sustainability. Enhanced usage of design tools and software supported by proper standards and specifications is essential to meet the demands of rapid growth.
- Energy efficiency, safety, resource conservation and waste control measures are key parameters both for existing assets as well as assets to be built in future.
- Design engineers' focus would be:
 - Reduction in overall construction time and cost.
 - Reduction in operation, maintenance and energy costs.
 - Increase in productivity and comfort.
 - Less waste and pollution
 - Health and safety of construction workers
 - Fewer user/occupant related illnesses/injuries
 - Longer life and flexibility in usage
 - Analytical models to assess effects of fire, wind, rain and earthquakes and build safety measures as required
 - Use of locally available/environment friendly materials

- Life cycle assessment of resources
- Technologies to collect, reuse or recycle construction materials
- Standardisation and simplification of designs.

8.3.2 Construction Materials

- Materials used in the construction sector are not equal in terms of their impact on environment since these:
 - Are derived from different raw materials (ores, wood, oil or plant origin)
 - Have different energy requirement for transformation, processing, transportation and usage.
 - Have varying recycling/degradability options.

The research and development for materials need to address all above aspects in addition to their availability close to the construction sites/regions.

- Major construction materials are: asphalt, concrete, steel, composites, roofing, coatings, wood, aluminium, masonry, glass.
- Both steel and aluminium have a high potential for recycling. Steel has become the material of choice in building construction, compared to concrete and timber. Steel building designs are more flexible, durable and adaptable.
- One of the major challenges before construction industry is energy efficient construction materials. In the last 30 years, the steel industry has reduced its energy consumption per ton of steel produced by 50%. For improvements in future, it will be necessary to identify and introduce breakthrough steel making technologies that are viable.
- Versatile properties of aluminium as a building/construction material need to be propagated for its extensive use. The environmental advantages of aluminium being an endlessly recyclable material consuming far less energy and substituting wood in the CDM efforts of the country need to be widely publicized.

8.3.3 Construction Machinery and Techniques

- Construction equipment accounts for 21-23 % of the total project cost and as such, variations in equipment pricing have a huge impact on the project costs. The prices of construction equipment vary according to the product.

As per estimates by Off-Highway research, the sale of construction equipment is expected to reach 84,000 units by 2014, of which infrastructure and real estate sectors will account for 70%. This translates into a CAGR of about 20% over the next five years (2009-2014) in sales of construction equipment.

Over the years, the equipment used in construction has improved significantly to provide better productivity, safety and accuracy. Mechanization ensures greater efficiency and

reduces the need for skilled labour. It also enables access to hazardous areas where manual intervention is not possible.

- Development areas include:

- Deployment of sustainable construction practices
- Enhanced usage of precast products
- Close proximity radiography
- Concrete production and placement
- Earth moving and mining
- Heavy lifting and material handling
- Tunneling and underground
- Crushers for aggregate and green sand preparation
- Mechanized Reinforcement Steel bar Cutting and Bending
- Auto/semiautomatic welding for piping and structures
- Induction Pipe Bending
- Primer Painting of Pipes and structures using auto-painting system
- Building scaffolding replaced by mounting cranes for finishing works
- Auto blasting of pipe, piping components and structural items
- Automation to enhance productivity and safety
- Facilitate availability and deployment of construction equipment through incentives/tax breaks
- Penetration of good practices into rural construction sector and low cost housing

- The research issues are diverse and numerous, yet very important due to the large scale of decisions made in the construction industry. The key Research & Development activities in construction sector for 12th Plan should focus on economic, financial and management aspects in the following ways:

- **Allocation of a Research & Development Budget for Construction Sector:**

There is a need to have a special allocation of R & D Budget for construction sector so that proper, scientific and wide variety of research in all aspects including economic and financial aspects relating to constructions sector can be undertaken.

- **Research on Supply Chain from Systems perspective:**

Construction cannot be viewed in isolation from its surroundings, and from its industrial and service base. The supply chain for construction includes practically the entire economy. As construction cannot function without energy, services, etc., the economics analysis of construction has to include the sustainable environmental analysis of the corresponding energy, as well as the other sectors of the economy. The suppliers of construction may have a larger environmental impact than construction itself. R & D in construction economics would

answer the questions like: Which alternatives have the lowest resource inputs and environmental emissions and wastes throughout their life-cycle? What are the reuse and recycling options, and do they make environmental and economic sense?

- **R&D in economic analysis of construction products from Life-cycle perspective:**

Infrastructure should properly be viewed from a life-cycle perspective. For example, design decisions at the beginning of a project have significant long-term effects. In terms of individual life-cycle stages, operation and maintenance and end-of-life environmental costs of facilities may outweigh all other costs. Hence Civil engineers, architects, construction engineers and managers have a crucial role in identifying right kind of technologies in such cases. To put in economic terms there may be considerable variation between benefit from construction activity and social cost of it. A cost benefit analysis approach is needed in many cases to determine such aspects. Models could be developed to ascertain benefits vis-a-vis costs for similar type of projects. Therefore, proper and scientific research is needed to determine the engineering and management options, and economic costs of end-of-life treatment of constructed facilities. The research may solve may issue like: For what period should facilities be designed? How do we predict the rate of obsolescence for our facilities? What is the planning period for the economic analysis of construction products?

- **Economics and Financing aspects in Construction design:**

The research and development activities in construction economics would enable the stakeholders involved in the sector to find answers to questions such as: How do we effectively communicate to construction professionals the environmental implications of material selection, design, facility siting, construction method, etc. choices? How do environmental issues get balanced with engineering, economic, quality and safety criteria? How do construction designs get optimized with the triple bottom line (engineering, economics and environment) in mind?

- **R&D research in operation and maintenance (O&M) aspects:**

From viability point of view, projects need to be analysed from the operation and maintenance (O&M) aspects. The O&M costs should be such so that the project may run smoothly throughout its life period. In funding construction projects, thus, many financial engineering and innovations are required to make it financially sustainable over the entire project life. More innovative research required in this field in order to reduce the O & M cost of construction projects.

- **Incorporation of Construction Economics and Management modules into existing courses in Educational Institutions:**

Traditional construction design and engineering education has focused on providing instruction in achieving and maintaining the highest standards in engineering, safety and quality of the built infrastructure at the lowest possible economic costs. Construction design and engineering education needs to incorporate economic, financial, management and environmental issues into education in a systematic way. The objectives of incorporating such modules in education are: (i) to provide every civil engineering student with a notion that economic, financial and environmental management issues are increasingly important in construction, in addition to the engineering and design aspects, and that construction activities have large economic, financial environmental impacts; and (ii) to teach students in construction engineering and management the practical methods and tools to lower the environmental footprint of construction design and engineering through economic, financial and management tools.

8.3.5 Supporting national Re-employment schemes

- Construction sector being the second largest employer in the country has enormous potential to support the national employment schemes such as Sampoorna Grameen Rozgar Yojana (SGRY) with NREGA being in place. With job creation being the primary objective, challenge lies in creating useful and productive job opportunities.
- NREGA has given ample opportunities for infrastructure development at the community level. Schemes include:
 - Ponds/Earthen Bunds
 - Wells
 - Masonry Check Dams
 - Mitti Murram Roads
 - Land Leveling
 - Guard Wells
 - Water conservation and Water Harvesting
 - Irrigational canals including micro and minor irrigation works.

These schemes require innovative technical support relating to feasibility studies, innovative design, surveying and cost estimation, prevention of soil erosion, conservation of water, availability of better tools for the workers etc.

- Optimally conceptualized schemes can stimulate investment, employment opportunities and livelihood creation which provide benefits to the community. Focus of such programmes would be on skill building and productivity improvement rather than on unskilled manual work to create an avenue for sustained livelihood and increase in income.

8.4.0 Way Forward

- Technology innovations for productivity improvement are basically of two kinds, viz. hardware and software focused. In context of construction industry, hardware implies construction material, construction equipment/machinery, construction techniques etc. whereas software includes design and engineering, project planning, control and management, quality control system, HSE practices etc. It is also very important to harmonize hardware and software for proper asset building.
- Obviously, such a vast slate of technologies can not be addressed by a single enterprise or institution and requires focused initiatives by the government in coordination with all the constituents of construction industry. Suppliers of materials, products and systems together with contractors have to jointly identify areas for innovation and decide on their priorities for accomplishment.
- Industrially advanced countries too depend on collaboration amongst all stakeholders to decide on policies and their implementation framework. Similar studies carried out in UK provide specific examples:
 - Rethinking Construction (1998), Sir John Egan
 - Rethinking Construction Innovation and Research (2002), Sir John Fairclough
 - Strategy for Sustainable Construction (2008), Strategic Forum for Construction
- It is suggested one of the organizations, pursuing these objectives, as defined earlier in this chapter along with the participation of policy makers, various research organizations, associations, academic institutions and industry be mandated to spearhead the collaborative effort needed to drive the R&D initiatives in Construction Industry. The nodal agency would:
 - Articulate its Vision and Mission
 - Draw out the policy framework including incentives and tax breaks for promoting innovations
 - Identify the funding arrangement for research
 - Define user requirements for R&D
 - Address issues relating to economics and management of construction sector

- Develop framework to support integration with NREGA and SGRY
- Set-up priorities and performance monitoring systems for R&D initiatives
- Generate awareness for quality, safety, pro-diversity and environment
- Develop programs for training and retraining of human resources
- Define mechanism for institutional financing of asset building including micro-financing in rural construction.
- Oversee conversion of R&D initiatives to benefits for all section of society.

CHAPTER 9.0
PROJECT EXPORT & OTHER ISSUES.

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9.1 PROJECT EXPORTS

Indian Construction Industry had been very active in the overseas market, especially the Gulf in the decades of seventies and eighties, when Indian companies ventured out to fill the demand for construction activities, fuelled by oil boom. Between 1975-80, Indian companies handled construction work worth nearly U.S \$ 5 billion. Out of this nearly U.S \$ 1.5 billion was repatriated back to India, mainly in the form of profits, wages and construction material exported abroad.

But this trend did not last, and by mid and late eighties the volume of contracts secured, fell down sharply. From U.S. \$443 million in 1986-87 the contracts came down to just US \$ 98 million in 1995-96. Though this was mostly due to the prevalent political situation in the Gulf region, even then it was a major drop for the industry. The major reasons for this indifferent performance are stated by the Construction Industry, as follows–

- i) Lack of a uniform policy (business friendly) to boost the project exports.
- ii) Lack of supporting, financial and Insurance system to mitigate the business risks.
- iii) Lack of government support in aggressively marketing Indian Products & Services in Construction, in overseas market.
- iv) Excessively high tax structure, resulting in costly raw material .

It is imperative that in order to boost this sub-segment of the Industry, the nodal agency together with the Government, brings about much desired changes. As suggested by the Working Group there is a need for nodal agency to facilitate close interaction with commercial sections of Indian Missions abroad to boost project export.

In order to boost export of both services and goods from Indian Construction Sector it is important to evolve and set up an institutional mechanism for maintaining operational and effective linkages with Indian Missions. In selected countries with a high potential for project export the commercial sections of the missions may be strengthened by placing a Industry's representative to create awareness and provide strengthening of Indian Construction Industry and to facilitate industry constituents from India to participate in bidding process of selected projects and also explore possibilities of promoting joint ventures in India and abroad. This would attract greater FDI and new technologies in the domestic construction sector.

9.2 GLOBALIZATION (WTO / GATS)

Action needs to be taken to streamline the functioning of Construction and Engineering Sector to achieve larger global business share, based on the commitments made so far, and the manner in which, they need to be made in future, so as to protect and increase Indian Construction Industry's share of Global business to achieve following.

- i) A larger share of construction within India.
- ii) A large participation in construction in other countries.

Other aspects that need to be borne in mind are-

- a) Trade in materials and positioning of domestic manufacturing Industry vis-à-vis the import regulations.
- b) Intellectual property rights and the patenting systems in India, their reciprocal recognition and mutual acceptance for the patents filed by the domestic agencies.
- c) Designing the entry requirements of the service providers.
- d) Insurance and financing regulations and their reciprocal relationship of systems in vogue in other countries.
- e) Dispute resolution mechanism.
- f) Environmental laws.

Since the rules of the game are being written and rewritten to meet the exigencies, as they arise, enhanced role of an apex body such as CIDC, to continuously work on such issues is also paramount.

Another very important feature, which needs to be considered is the financial strength and patronage to be extended to the domestic operators.

As reported, the financial strength, both at the Corporate and also at the Institutional financing level, has to be revamped. It is a well known fact, that this is the most powerful lever used to swing the businesses world over, coupled with the regulatory framework.

Following initiatives need to be taken, for quality upgradation and capacity building of the operators.

<u>Issues</u>	<u>Initiatives</u>
A. Regulatory Framework	i) Development of a Construction Business act./ construction law ii) Development of an Engineering Council of India. i) Development of an Arbitration Council
B. Construction Financing, Business Practices, Capacity Building, & Risk Mitigation	i) Development of a Construction Equipment Bank. ii) Grading of Construction Entities. iii) Development of the Concept of Lender's Engineer / Lender's Auditor. iv) Development of Insurance products. v) Development of the lending norms and eligibility criteria for the borrowers.
C. Human Resource Development, Construction Economics, Data base creation.	i) Creation of a database and data mining. ii) Development of Construction Cost Indices, and other economic parameters. iii) Training and Certification of Construction Workmen. One of the options that need to be considered is establishment of "Construction Industry Training Board/ Authority on the lines of a similar institution in other countries." iv) Training & Certification of Construction Managers. v) Establishment of a "Human Resource Development Fund" for construction industry. The fund may be operated by "Construction Industry Training Board/Authority".

9.3 TAXATION

The second major problem is that of very high incidence of direct and indirect taxes for construction and construction related activities, as compared to other sectors. High taxation is at both the ends, the input stage (construction material, equipment and land and services) and at the process stage (work contract tax) etc.

1. Excise on cement and steel, most important inputs into construction activity are one of the highest in the country. Average taxation rate for cement and steel works out between 45.6 to 61% and 35.40% respectively (the variations are due to different tax regimes in different states.)
2. To meet stringent quality and productivity conditions and to adopt better technology, import of construction equipment becomes necessary (as domestic construction equipment manufacturing capacity is extremely poor.) Import attracts heavy custom duties further loading additional cost burden.
3. There is also a need to consider reduction in excise duty on manufacturing of construction equipment required ;in construction works particularly those needed for roads sector.
4. Interstate taxes, specially on the movement of materials and equipment.
5. In addition to the excise and sales tax the other taxes that are levied are octroi and entry tax, further increases the cost of the project.
6. Works contract tax including fabrication and civil construction is also to be paid on the process of construction, which is another 4-5%.
7. Further, stamp duty on land acquisition and registration has to be paid that, again increases the cost of the project.
8. Depreciation norms do not reflect the actual consumption of plant and machinery and hence, further indirectly increase the costs and hinder the construction activity and improving efficiencies. Earlier, the depreciation rate on equipment was 33%, which has

now been reduced to 25%. An important aspect, which needs to be understood is the conditions of operation of the equipment. Unlike factory operations, construction equipment operates in more severe conditions, and without the benefit of controlled working conditions. Construction equipment thus depreciates faster and, therefore this aspect needs to be considered while deciding depreciation rates.

9. With new enactment of imposition of Service Tax on Construction services yet another anomaly has been created, which needs transparency in application

10. Nearly 15% of the project cost of an infrastructure project goes towards indirect taxes and another 20-30% is the direct tax component on the inputs like material and equipment. This coupled with income and/corporate taxes adds significantly to the cost of the construction and hence the cost of projects.
11. Moreover, along with high taxation rates for construction, there are no incentives that are available to Construction Industry in terms of tax benefits and other fiscal benefits. Even in terms of project exports, manufacturing sector gets 100% deduction from export business u/s 80HHC whereas construction gets only 50% deduction.
12. Similar, no deductions/incentives are available to construction industries for executing works in backwards areas, though they contribute a lot towards backwards regions development. The same benefits are available to a manufacturing/other industry operating in a backward region.

It is noteworthy to mention that, in the context of Construction Activities, State has been and would be the biggest procurement agents. Even in the fully liberalized economics, (United States/Western Europe) State continues to enjoy this status.

Multi-source taxation, causes substantial opacity, adds to the overall cost of procurement, rendering construction activities to become uncompetitive, specially in the context of Globalization, and eventually reduces value addition, in terms of ingress and development of new technologies, research & development, and reduces the overall earning potentials of the State, operators, and individual citizens.

It is therefore proposed to revise the taxation norms applicable for the Construction Industry, giving due cognizance to the above, through development and implementation of

–

- a) A taxation manual for Construction Industry, where multi source taxation is eliminated.**
- b) An implementation plan**

It is further proposed to conduct a detailed study to articulate the desired actions.

9.4 COMBATING NATURAL DISASTER

Natural disasters are natural, but for survival, societies need

- a) Warning and predictions.
- b) Taking preventive measures.
- c) Having manpower, trained to handle the repugnant situations.
- d) Regulations to prevent occurrences of man made disasters.

Although the Government has taken steps to enact National Disaster Management Act and set up a dedicated organization, the act needs intensification and synergy with Construction Industry.

Need for Action at the Professional Level

There is an increasing realization that the problem of natural disasters is grave because their frequency has recorded more than five fold increase in the last two decades. The economic losses are continuously rising (for example rise in total insured losses are about six times the world over).

With advancement in science and technology for predictions, warning and managing the impact of natural hazards it is now possible to shift our reliance from traditional crude methods of surveying and mapping of hazardous area to the use of modern powerful tools like digital cameras and devices that straight away delivery maps of very high resolution. The GPS

provides a powerful tool to monitor even inaccessible locations all over the globe. There are also very reliable early warning systems based on actual measurements using reliable and powerful sensors.

There is a need to evolve a mechanism for sharing of information and knowledge amongst the decision makers in local bodies. The state/local governments should concern themselves to set up institutional mechanisms for investigations on safety of structures and enhancement of safety against natural hazards those may occur in their regions.

It is therefore proposed that an integrated plan of action be drawn, with a conscious thrust on creating following:

- a) Setting up Disaster Identification Centres, through out the Nation**
- b) Setting up Retrofitting Clinics, through out the Nation.**
- c) Training Professionals to learn to construct, maintain, and rehabilitate structures to combat the impacts of Natural Disasters.**

9.5 ECONOMIC PARAMETERS

For an important economic activity such as construction, there is a need to research and evaluate various economic parameters on permanent basis. CIDC is involved in evaluating the Construction Cost Indices, to evaluate the gross price fluctuations. Similar indices signifying various movements need to be assessed to give a pointer to the economists to monitor the health of economy.

It is proposed that a nodal centre for monitoring construction economy be established through necessary budgetary support.

9.6 CONSULTANCY AND ADVISORY SERVICES

The role of advisory and consultancy services in strengthening the stature of Construction Industry is vital. In specific term following are the functions discharged by them

- b) Pre feasibility, feasibility and project studies.**

- c) Financial analysis and Risk assessment as Lender's Engineer, pre, during and post execution including IPR issues.
- d) Detailed engineering
- e) Project management and commissioning services
- f) Post Completion activities
- g) Dispute Resolution and adjudication.

Although the monetary volume of such activities annually, (with the present work load 2011 level) should be close to Rs. 55,000 crores, the value of services being rendered by the Indian Consultants is but only a small fraction. (In the range of Rs. 10,000 crores).

This reflects a severe weakness in our overall system and needs substantial strengthening. Following reasons could be attributed.

- a) Indifferent stature of consultancy service providers (Fragmented, small firms)
- b) Absence of a unified National Policy on the growth and development of consultancy business.
- c) Lack of Institutional financing systems to enable consultancy service providers to invest in Human Resources.

It is noteworthy to mention that the average output of a Consultancy Organization in India, is estimated at US \$ 10,000/- per person, whereas his counterpart ;in other South-Eastern Asian Nations generates US \$ 22,500/- and those in developed countries, (United States and Western Europe) would generate US \$ 55,000/- p.a.

The lower productivity, results in being able to hire relatively low skilled manpower, thereby being able to execute the lower end of the work.

It is therefore proposed to work on the grey areas defined above and evolve a work plan accordingly.

9.7 UNIFIED OVERALL INSTITUTIONAL FRAMEWORK

At the end, there is no unified and well defined framework under which the Construction Industry is expected to function. There are no identified agencies that regulate and constantly monitor the functioning of the Construction Industry.

The present institutional framework is characterized by multiplicity of government departments that are responsible for a variety of functions in the construction sector, and at various levels. In fact, as stated earlier government is the largest project owner, investor and executor in this sector, requiring a mechanism for coordination between all these activities.

The structure of Construction Industry in India is highly skewed and characterized by small number of large construction companies, followed by very few medium level companies, and then followed by a very large number of small and petty contractors. It is ironic though, that the companies belonging to large segment in domestic context are also small when compared with those having International presence.

If the massive task of infrastructure building has to be carried out, concerted efforts have to be made by the government under an institutionalized framework to change the skewed structure of Construction Industry, infuse better technology, further construction labour welfare and increase productivity and capacity of Construction Industry in India. The Construction Industry Development Council (CIDC) has been set up to promote the development of this industry but it has no regulatory or monitoring role or powers.

9.8 ASSET MANAGEMENT & MAINTENANCE

Creation of physical assets is an obvious and important outcome of the efforts made by the country to build its physical infrastructure. Building of the Infrastructure is an essential and continuous activity, since, apart from improving the quality of life for the citizens, it creates wealth, sustains the growth of development, nurtures softer side of life through creation of a feeling of general well being.

Ever since the Country embarked on the path of liberalizing the economy, construction of physical Infrastructure has been receiving emphasis in successive five year Plans. It is estimated that about Rs. 310,000 crores are being spent annually in constructing the Assets, may they be in Housing, Transport, Energy, Communication, irrigation and Agriculture sector. But, these assets are seldom maintained properly.

It is high time that the causes of this malady be established.

The lack of maintenance of assets is due to: -

- a.) Lack of social sensibilities defining ownership of Assets.
- b.) Absence of necessary framework, ensuring mandatory maintenance of Assets.
- c.) Lack of proper expenditure planning and also inadequate budgetary allocations for proper upkeep and maintenance.
- d.) Lack of right-scale maps/GIS data base indicating the location of assets.
- e.) Lack of trained professionals both at planning, administration levels as well as at the cutting edge level.

In order to maintain the publicly owned estates & properties, the system being followed in other countries is as follows.

- h) **Financial** – Levies of maintenance surcharge based on actual market price assessment, collectable from the occupying agencies.
- i) **Management** – Through specialized professional service providers on term contract basis.
- j) **Bye-laws** – The Civic Authorities stipulate, the provision, inspect, & penalize violators.

In certain cases, where float situations arise (Vacant occupancy), the developer / owner, creates a dedicated solatium fund.

9.9 LABOUR AND SAFETY ISSUES OF CONSTRUCTION WORKERS

9.91 LABOUR

Construction Industry is the second largest employer after agriculture, employing about 41 million persons. Agrarian background, migratory nature and a very high degree of transitory employment characterize the profile of employment and labour in Construction Industry.

Government itself considers construction as a major source of employment generation in rural areas, where agriculture and landless labourers are provided employment on a temporary basis in construction activities to compensate for unemployment during the non harvesting seasons, droughts, floods and other natural calamities.

Even after recognizing the employment generating potential and potential for supplementing employment in rural areas, government has not made enough efforts towards creating regulatory framework for the construction labour.

13. At present there are only two categories of labourers, agriculture and industrial, which in most cases does not effectively meet the needs of construction labour.
14. There are scores of labour laws as detailed elsewhere that are applicable to construction, but these are seldom implemented. Instead they give rise to multiplicity and corruption.
15. Lack of framework and clarity has resulted in under reporting of labour employed for construction activity. According to some estimates, only 20% of actual workers are reported.
16. At present, to hire labour, a contractor is required to obtain a labour license, for which he has to insure the workers under workmen compensation insurance policy. This policy requires the contractor to pay a premium for the policy based on the total value of the wages paid. Since large majority of the contractors have no access to institutional sources of finance and in view of the high business risks and costs, the labour benefits are easily dispensed with through underreporting and non-payment of worker dues.

17. Dues to the highly unorganized nature of employment, the workers are also not given the statutory provident funds and other benefits, which should be available to them. In almost all the cases, the existing system of labour contract hurts the labour welfare component. It also hinders better technology adoption (as labour is cheap) and skill upgradation of the workers due to lack of training entities and any regulatory frame work for employing certain percentage of trained labour. Low technology and low skill levels not only increase the inefficiencies of the construction sector but also lead to low value addition, productivity and quality.
18. Whereas the benefit of P.F. contribution to the Construction Workers has been extended, in practical terms the workers are not able to use this.
19. The similar situation exists,; in case of employing the proceeds of the Construction Workers Welfare Cess, now being collected by the State Governments, since enactment of CWWA 1996.

As regards the upper levels, it is also to be understood that majority of the educational programmes of engineers being offered, have no back up of continuing professional development. The second malady, with which the Industry has to live with, is the migration of qualified Civil Engineers to fields such as IT. As a result, the real numbers of engineers available to Construction Industry, are rather low and inadequate. Then, there are issues of Women Workforce which constitutes approximately 49 % of total labour strength and continues to render services without avenues of growth.

Women : As a substantial segment of the construction Industry work force, the Women Workers need special attention on following issues.

- (a) Vocational Training & skill upgradation
- (b) Provision of stipulated social benefits as per the relevant act.

On a comparative scale, Women Workers, seldom go beyond the skilled workpersons level and majority of these (95%) remain at Semi / Unskilled levels. Skill upgradation of Women Workers, thereby raising the earning potentials and delivering quality products need to be looked into both at Government and industry level.

Child Workers : It is heartening to note that the present day employers have refrained, consciously to recruit and employ Child Workers. Still there are stray cases in hinterland and it is advised to step up and enhance the vigilance levels for eradicating this menace.

Improvement of Working Condition – In the recent years, the Government has taken several laudable initiatives such as

- a) **Mandatory provision for instituting PF Scheme among casual workers.**
- b) Introducing Workers Welfare Cess

It is recommended that effective utilization of such funds be made for the workers in the areas

- a) Providing Social relief and benefits
- b) Human Resource Development
- c) Rehabilitation Programmes
- d) Literacy Programme

It is further recommended that some kind of Permanent Identification number be granted to the workers, and a nation wide scheme of granting e-cards be launched for effective availability of the benefits.

At present except for a few initiatives taken up by CIDC and some corporates, there is no institutional framework to impart training at workers-level.

- 20. The Construction Industry affords very low returns for qualified professional, which is increasingly leading to decline in professional and trained manpower in the industry. This will in turn effect the overall capacity of Construction Industry in India in long run.
- 21. There is no restriction on entry into this sector by unqualified players, which further results in low quality and productivity and very high degree of competition, which acts as a disincentive to the qualified professionals.
- 22. Initiatives taken by National Highway Authority of India and the State Government of Madhya Pradesh to introduce a prequalification requirements regarding mandatory

employment of 5% strength of workers, who are tested and certified, in this direction, is a welcome step which needs to be replicated else where.

It is therefore proposed that a National Personnel Policy for construction Industry be developed to cater to the above defined exigencies.

9.9.2 SAFETY ISSUES OF CONSTRUCTION WORKERS

It is estimated that nearly 31 million workers in the country are engaged in building and other construction works. Workers employed in Construction works are highly vulnerable segments of labour force particularly because of its unorganized nature. The workers in construction industry are characterized by inherent risk to the life and limbs. The Construction activities are also characterized by its casual nature, temporary relationships between employer and employee, uncertain working hours, lack of basic amenities, inadequacy of welfare facilities and casual approach of employers for the problems of workers. In the absence of adequate statutory provisions, the requisite information regarding the nature and number of accidents is also not generally available.

Although the provisions of certain Central Acts are applicable to the workers in construction industry, yet a need has been felt for a comprehensive Central Legislative for regulating their safety, health and welfare and other conditions of service. The State Governments and UT Administrations were consulted in the matter and majority of them had favoured such a legislation. Consequently the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act was promulgated after being passed by both the Houses of Parliament and having received the assent of the President on 19th August 1996.

This, inter alia provides for nearly all matters relating to safety, health, welfare and service conditions of building and Construction Workers. The Act extends to the whole of India and applies to every establishment which employs or had employed on any day of the preceding twelve months, ten or more building workers in any building or other Construction Work.

Only four states in initial years, had set up welfare boards provided under the above Act. While 9 other states (including Uts) had set up Expert Committees to frame rules. However it is seen that in the absence of an administrative mechanism provided under the Act resources could not be collected from Construction Contractors for implementation of schemes like immediate assistance to beneficiaries in case of accidents, pension at age of 60 yrs, premiums for group insurance and medical expenses etc.

As has been frequently noted that there are large number of rules and regulations for health, safety and welfare of construction workers but their compliance is loose. There is need to enhance vigilance on the work of safety Management Teams which many large Construction Companies normally setup. The manpower constituting these teams need to be adequately trained not only in simple compliance procedures, but in hazard and risk assessment in their specific projects with a view to pre-plan risk reduction against expected hazards. This aspect is increasingly gaining importance with fast rise in mechanization of Construction Works (where heavy machines are often used) and also types of high-rise buildings coming up in most urban areas.

Inspections of stipulated measures for safety of workers should be properly documented alongwith names of inspecting officials and dates so that responsibility for negligence could be fixed. A system of demerit-points can be thought for action against those contractors who have poor safety records.

9.9.2 PRODUCTIVITY

Construction industry concerns with two aspects of productivity, firstly with over all volume of the output in terms of construction works; secondly the output per unit of consumption of resources such as raw materials, manpower and financial inputs. Building up capacity of the industry being one of the main areas of focus would need introduction of efficient technologies and modern management techniques to raise productivity of the construction industry. Enhancement of productivity will be require employing of trained workers, right type of professionals for execution of projects supplemented with project management consultants. The other aspect of productivity pertain to manufacturing sector of building materials and components where efficiency of resource utilization is to be upgraded by employing latest production technologies.

F.No.18/5/2011-Tpt.
Government of India
PLANNING COMMISSION
(Transport Division)

Vojana Bhavan, Sansad Marg
New Delhi, dated 22-09-2011

**Subject: Constitution of Working Group on Construction Sector (Research & Development)
in the Twelfth Five -Year Plan (2012 – 2017)**

In the context of the formulation of the Twelfth Five Year Plan, it has been decided to set up a Working Group on Construction. The composition of the Working Group will be as follows:

1.	CMD, EIL	Joint Chair
2.	DG, BMTPC	Joint Chair
3.	Members - to be nominated by the Chair	
4.	Shri. Sunil Mahajan, Director, CIDC	Convenor

II. Terms of the Reference for the Working Group.

1. To study and analyze the Indian Construction Industry, keeping in view the focus on creation of a world class infrastructure and rebuilding rural India through schemes such as Bharat Nirman and MNREGA. To make an assessment of qualitative and quantitative capabilities of the Indian Construction Industry in the background of category-wise projections for construction and allied supporting activities in the 12th Plan with a view to evolve strategies for overcoming deficiencies and bottlenecks and achieve time bound targets, by suggesting measures for better coordination among the stake holders.
2. To review the regulatory framework governing the sector including fiscal and other regulations and suggest any changes required to make the sector more efficient and productive.
3. To focus on R&D activities in the construction sector and suggest measures for greater use of modern technologies and equipment and speedy adaptation of new methods.
4. To review the quality and safety aspects in construction and to suggest necessary measures, and to recommend measures for evolving a Techno-legal regime.

5. To study the impact of this industry on environment and suggest measures to make it more environmental friendly and sustainable; to also review the present regulatory framework for environmental clearance with a view to making it more business friendly.

6. To review the status of data base in the construction sector and to suggest ways and mean to upgrade, augment and effectively maintain the same on institutional basis.

7. To study the best practices adopted worldwide and draw lessons for the Indian Construction Industry.

8. To suggest a policy framework for the increase productivity and reducing construction costs, in order to ensure the healthy development of the construction sector after examining/ reviewing of the above mentioned areas and the existing regulating from work.

9. To recommend the measures for self-regulation for the constituents of the Construction Industry.

10. To evolve suitable mechanisms to ensure implementation of the recommendations of this group during the 12th plan period.

11. To examine any other matter considered important by the Working Group.

III. The Chair of the Working Group may co-opt officials or non-officials as Members. Representatives nominated, if any, by the Central Ministries/ Organization should not be below the level of Joint Secretary.

IV. The non-official Members of the Working Group will be paid TA/DA at the rates applicable for Grade-I officers of the Central Government for attending meetings of the Working Group.

V. The Working Group will submit its final report to the Planning Commission by 15th October and an interim report by 1st October


Dr. Manoj Singh
Advisor (Transport)

Copy to:

- a. Chairman, all Members and Convenor of the Working Group.
- b. PS to Deputy Chairman, Planning Commission

- c. PS to Minister of State (Planning)
- d. PS to all Members, Planning Commission
- e. PS to Member-Secretary, Planning Commission
- f. All Principal Advisor/Sr. Advisors/Advisors/HODs, Planning Commission
- g. Director (PCMD), Planning Commission
- h. General Branch I and II, Planning Commission
- i. Accounts-I Branch, Planning Commission
- j. Information Officer, Planning Commission
- k. Library, Planning Commission


Dr. Manoj Singh
Advisor (Transport)