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GUIDELINES ON SKILL DEVELOPMENT OF WORKMEN IN ROAD SECTOR

INDIAN ROADS CONGRESS
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ABBREVIATIONS

AA	Assessment Agency
AB	Assessing Body
ADB	Asian Development Bank
ASTI	Advanced Skills Training Institute
ATI	Advanced Training Institute
BAI	Builders Association of India
BIS	Bureau of Indian Standards
BOCW	Building and Other Construction Workers
BRO	Border Roads Organization
CBDT	Central Board of Direct Taxation
CFI	Construction Federation of India
CIDC	Construction Industry Development Council
CII	Confederation of Indian Industry
CPWD	Central Public Works Department
CREDAI	Confederation of Real Estate Developers Association of India
CRF	Central Road Fund
CRRI	Central Road Research Institute
CSDCI	Construction Skill Development Council of India
CSR	Corporate Social Responsibility
CSTI	Construction Skills Training Institute
CVT	Construction Vocational Training
DBT	Direct Benefit Transfer
DGE&T	Director General of Employment & Training
DGT	Director General of Training
EHS	Environment, Health & Safety
GET	Graduate Engineering Training
GQ	Golden Quadrilateral
HCC	Hindustan Construction Company
HUDCO	Housing and Urban Development Corporation
IAHE	Indian Academy of Highway Engineers
ICEMA	Indian Construction Equipment Manufacturers Association
IESC	Infrastructure Equipment Skill Council
ILO	International Labour Organization
IRC	Indian Roads Congress
ITI	Industrial Training Institute
JBIC	Japan Bank for International Cooperation
MDR	Major District Road
MES	Modular Employable Skills
MoLE	Ministry of Labour & Employment
MoRD	Ministry of Rural Development
MoRTH	Ministry of Road Transport & Highways
MSDE	Ministry of Skill Development & Entrepreneurship

NABL	National Accreditation Board for Testing and Calibration Laboratories
NAC	National Academy of Construction
NBCC	National Buildings Construction Corporation (India) Ltd.
NCGTC	National Credit Guarantee Trustee Company
NCVT	National Council on Vocational Training
NH	National Highway
NHAI	National Highways Authority of India
NHBF	National Highway Builders Federation
NHDP	National Highways Development Project
NIMI	National Instructional Media Institute
NICMAR	National Institute of Construction Management and Research
NOS	National Occupational Standards
NQF	National Qualification Framework
NRRDA	National Rural Roads Development Agency
NSDA	National Skill Development Agency
NSDC	National Skill Development Corporation
NSDCB	National Skill Development Coordination Board
NSQF	National Skill Qualification Framework
NSQC	National Skill Qualification Committee
NSS	National Service Scheme
ODR	Other District Road
OS	Occupational Standards
PMGSY	Pradhan Mantri Gramin Sadak Yojana
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
PMNCSD	Prime Minister’s National Council on Skill Development
PPE	Personal Protective Equipment
PPP	Public Private Partnership
QP	Qualification Packs
RDAT	Regional Directorate of Apprenticeship Training
RPL	Recognition of Prior Learning
SDI	Skill Development Initiative
SDIS	Skill Development Initiative Scheme
SDMS	Skill Development Management System
SH	State Highway
SHE	Safety, Health and Environment
SSCs	Sector Skill Councils
ToT	Training of Trainers
TP	Training Provider

PERSONNEL OF THE GENERAL SPECIFICATIONS AND STANDARDS COMMITTEE (GSS)

(As on 25th April, 2018)

1.	Kumar, Manoj (Convenor)	Director General(RD) & Special Secretary to the Govt. of India, Ministry of Road Transport & Highways, New Delhi
2.	Nagpal, A.K. (Co-Convenor)	Additional Director General, Ministry of Road Transport & Highways, New Delhi
3.	Balakrishna, Y. (Member Secretary)	Chief Engineer(P&B)SR&T,Ministry of Road Transport & Highways, New Delhi
4.	Agrawal, C.P.	Secretary, Public Works Department, M.P.
5.	Amitabh, Manu	Chief Engineer, Central Public Works Department, New Delhi
6.	Basu, Kaushik	Chief Engineer, Ministry of Road Transport & Highways
7.	Bhandari, Dr. R.K.	Chairman, INAE & Geohazard Specialist, New Delhi
8.	Chandra, Dr. Satish	Director, Central Road Research Institute, New Delhi
9.	Garg, Anil Kumar	Chief Engineer(NH), PWD, Rajasthan
10.	Jha, Kumar Neeraj	Associate Professor, Indian Institute of Technology, Delhi
11.	Kumar, Ashok	Consultant, M/s Feedback Infrastructure, New Delhi
12.	Kumar, Dinesh	E-in-C(Retd.), Public Works Department, Delhi
13.	Kumar, Uttam	Director(Projects), National Rural Roads Development Agency, New Delhi
14.	Lal, Mohan	Superintending Engineer-North, Delhi PWD, New Delhi
15.	Mathur, Harish	Technical Director, IL&FS, New Delhi
16.	Mehta, U.C.	Addl. DGBR(East), Border Roads Organization
17.	Nahar, S.S.	Director, Indian Academy of Highway Engineers, Noida
18.	Patankar, V.L.	Addl. Director General(Retd.), Ministry of Road Transport & Highways, New Delhi
19.	Pawar, Ajit	Secretary(Retd.), Maharashtra PWD
20.	Pipri, K.K.	Chief Engineer, National Highways, Raipur
21.	Prakash, Indu	DG(RD) & SS(Retd.), Ministry of Road Transport & Highways, New Delhi

22.	Puri, S K	DG(RD) & SS(Retd.), Ministry of Road Transport & Highways, New Delhi
23.	Rajawat, V.K.	Technical Director, NHIDCL, New Delhi
24.	Rajoria, K.B.	Engineer-in-Chief(Retd.), Delhi PWD, New Delhi
25.	Rao, P. Ravinder	Engineer-in-Chief(R&B), Hyderabad
26.	Sharma, R.S.	Managing Director, M/s STP Limited, New Delhi
27.	Singh, A.K.	Member(Projects), National Highways Authority of India, New Delhi
28.	Singh, B.N.	Additional Director General, Ministry of Road Transport & Highways, New Delhi
29.	Singh, Nirmaljit	DG(RD) & SS(Retd.), MoRTH, New Delhi
30.	Singh, V.K.	Engineer-in-Chief, PWD, U.P.
31.	Sinha, A.V.	DG(RD) & SS(Retd.), Ministry of Road Transport & Highways, New Delhi
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33.	Verma, Maj V.C.	President, National Highways Builders Federation, New Delhi
34.	Wakchaure, Dr. Sanjay	Superintending Engineer, Ministry of Road Transport & Highways, New Delhi

Corresponding Members

1.	Indoria, R.P.	DG(RD) & SS(Retd.), Ministry of Road Transport & Highways
2.	Swarup, Dr. P.R.	Director General, Construction Industry Development Council, New Delhi

Ex-Officio Members

1.	President, IRC	(Reddy, K.S. Krishna), Managing Director, M/s KRDC Ltd.
2.	Director General (RD) & Spl. Secretary to the Govt. of India	(Kumar, Manoj), Ministry of Road Transport and Highways, New Delhi
3.	Secretary General	(Nirmal, S.K.), Indian Roads Congress, New Delhi

GUIDELINES ON SKILL DEVELOPMENT OF WORKMEN IN ROAD SECTOR

INTRODUCTION

Developed infrastructure provides strong backbone for sustainable socio-economic development of a nation and highways being the most important infrastructure sector, forms the arteries of economic development. India is one of the fastest developing economies of the world. It has second largest road network in the world. Traditionally, allocation for Road Sector, among the ten subheads in Government of India's five Year Plans, is the second highest, next only to Electricity and Power and has been varying around 15-17 percent of the total investments in the Infrastructure Sector.

Construction Industry is the third largest employer in India after agriculture and manufacturing. It employs more than 5.6 crore workers. Highway Sector is highly process oriented. For adhering to the specified processes, trained and skilled manpower is essential not only at managerial and supervisory level but also at the cutting edge level of workmen and technicians.

With huge planned investments in Roads and Bridges, even a marginal increase in skill level is expected to yield improved output and quality of the roads leading to savings in initial cost, maintenance costs, safety and fuel efficiency. However, the low skills of the construction workers lead to lower productivity and poor quality of output. A need was felt by the Human Resource Development Committee (G-2) to prepare a document dealing with skill development of workmen in road sector. Accordingly, the task was taken up by G-2 Committee in 2012-2014 tenure. The initial draft was prepared by Shri K.B. Rajoria, Shri K.N. Aggrawal, Shri O.P. Goel, Shri D.P. Gupta, Shri S.K. Vij and Shri O.P. Shrivastava. In the year 2015, the G-2 Committee was reconstituted and the task was assigned to Shri Shishir Bansal and Shri H.K. Srivastava to review and modify the document in line with MoRTH/Govt. of India policies. The document was discussed by the G-2 Committee in a number of meetings.

The G-2 Committee (personnel given below) in its 9th meeting held on 17.02.2017 finalized the document and recommended its submission to the General Specifications & Standards Committee (GSS) for its consideration. The GSS Committee in its meeting held on 24th June, 2017 after deliberations, referred the document to Sub-Group of GSS Committee constituted under chairmanship of Maj. V.C. Verma comprising Director, IAHE, Shri K. B. Rajoria, Convenor, G-2 Committee, CE, S,R&T (R), MoRTH; Shri Kaushik Basu, CE, MoRTH & Ms Neha Vyas, Senior Environmental Specialist, World Bank to look into matter and reframe the document covering discussed aspects while keeping harmony with MSDE policy on skill development. The document was discussed in a number of meetings by Sub-Group and the Sub-Group in its meeting held on 19.01.2018 finalized the draft document for onward submission to GSS Committee. The document was approved by the GSS Committee in its meeting held on 25.04.2018 and thereafter by the Council in its 215th meeting held on 4th May, 2018 at Aizawl (Mizoram). The observations of the Council were reviewed and draft modified accordingly for publishing. Shri H.K. Srivastava, Member, G-2 Committee did outstanding work for finalizing the draft. His contribution is highly appreciated.

The list of personnel of G-2 Committee is as under:

Rajoria, K.B.	Convenor
Jhamb, S.B.	Co-Convenor
Bansal, Shishir	Member Secretary

Chapter 1 gives details of development of Transport Sector during post Independence period. There has been phenomenal development in road sector, particularly for National Highways and Rural Roads. “Road Development Plan Vision 2021” document lays stress on creating training cells. **Chapter 2** deals with statutory skill level of workmen giving details of employment from year 1995 onwards. Issues related with skill development have also been enumerated.

Chapter 3 gives details of initiatives taken by Government for skill development up to 11th Five Year Plan. Different institutions of Government took initiative to conceptualize issues related to Skill Development of Workmen. **Chapter 4** deals with further initiatives by Government wherein whole concept was reviewed and units created to work for skill development after National Policy for Skill Development and Entrepreneurship 2015 was announced by the Government and a separate Skill Development Ministry was formed by Government of India. **Chapter 5** gives some of the policies encouraging the skilling mission and incentives available.

Chapter 6 gives details of field of activities in Road Sector and various categories of Workmen to be covered, have been brought out. List of courses already developed has also been given. In **Chapter 7**, provision regarding skill development in contract document of different organizations have been brought out. **Chapter 8** gives details of existing training facilities.

Chapter 9 covers critical review of apprenticeship act provision for construction sector bringing out modifications required. **Chapter 10** describes comprehensive details for building capabilities for training of workmen. Construction is different from industry and building capability for skill development in this sector is possible by associating contractors and imparting training at project sites. **Chapter 11** deals with a specific category of Laboratory Technicians, just to demonstrate that for different categories, different approach is required. **Chapter 12** deals with training of trainers. **Chapter 13** gives the way ahead to ensure success of skill development initiatives.

CHAPTER 1

TRANSPORT SECTOR IN THE POST- INDEPENDENCE PERIOD

1.1 Before independence, the transport system consisting of mainly railways and roads, was developed primarily to provide communications with the major ports and larger cities. The focus changed after independence for rebuilding the transport network and making it responsive to the development needs of the economy. Not only were the rail and road network expanded but efforts were made to develop other modes of transport such as shipping, ports, air, inland water transport, etc. A portion of the proposed investment was set apart to promote transport in the remote and backward regions of the country with a view to opening them to the growth process.

1.2 The National Highways Authority of India (NHAI) was established as a statutory entity under NHAI Act, 1988. However, it was operationalized in February, 1995 with the appointment of a full time Chairman. NHAI's initial mandate in 1996 was a few projects undertaken with the assistance of Asian Development Bank (ADB) and Japan Bank for International Cooperation (JBIC). Subsequently, in 1998, the Govt. of India announced the major initiatives of up-gradation and strengthening of the National Highways through the National Highways Development Project (NHDP) comprising mainly the four lane Golden Quadrilateral (GQ) linking the four metros and connectivity to major ports in the first phase and North-South and East-West corridors in the second phase. Later on the scope was extended into 7 phases as below:

i) The Golden Quadrilateral Corridor comprising a total length of 5,846 km. The entire stretch is complete.

ii) NS & EW Corridors – Phase I & Phase II of NHDP comprising 4 laning of 7,142 km.

iii) NHDP Phase III for 4 laning of existing National Highways comprising 12,109 km not covered under GQ and NS & EW Corridors.

iv) Under NHDP Phase IV, 2 laning of 14,799 km with paved shoulders has been approved.

v) Six laning of the Golden Quadrilateral and a few other selected stretches are covered in NHDP Phase V covering 6500 km.

vi) NHDP Phase VI covers development of 1000 km of expressways.

vii) NHDP VII covers development of ring roads, bypasses, grade separators and service roads etc. in a length of about 700 km. The estimated cost is Rs. 15,000 cr.

Thus, about 48,096 km of roads have been approved under NHDP. As on 31st March, 2018 about 25,641 kms have been completed. Though several reasons are attributed to this shortfall, one reason for poor performance of contractors could easily be attributed to non-deployment of skilled work force.

1.3 Rural Roads comprise over 80 percent of the road network. Their being kept in serviceable condition is crucial to agricultural growth and to provide access to crores of rural people to social and economic facilities. The Ministry of Rural Development (MoRD) launched the Pradhan Mantri Gramin Sadak Yojana (PMGSY) on 25th December, 2000 to connect with all-weather roads, all the habitations with population of 500 and more (250 in hilly, desert and tribal areas)

in first instance. The programme is funded through Central Road Fund (CRF), borrowing from multilateral agencies and budgetary support of the Centre and the States. The PMGSY also covers upgradation of existing roads serving to the targeted habitation. The PMGSY targets include new connectivity to about 1,67,000 habitations involving construction of about 3,65,000 km of roads apart from upgrading about 3,73,000 km of existing rural roads to the prescribed standards. The rural roads constructed under PMGSY will be maintained by concerned State Government. As on 11th June, 2018, 6,27,212 km of road has been constructed or upgraded under the PMGSY. In addition, a new intervention as PMGSY II has been launched in August, 2013. It aims to consolidate existing Rural Road Network by upgradation of existing selected rural roads on their economic potential and their role in facilitating the growth of rural market centres and rural hubs. It also aims to act as a catalyst for livelihood based programmes including ***Aajeevika*** launched during the 12th Five Year Plan. Similarly, the States have been undertaking development of State Highways (SH), Major District Roads (MDR) and Non-PMGSY rural roads. Upgradation and Capacity Augmentation of Roads and Bridges is also receiving increasing attention of Urban Local Boards and State Governments. All this underline the need for skill development of workmen in the road construction sector.

1.4 The Vision Document (Road Development Plan Vision 2021) covers the period from 2001 to 2021. It aims, among other things, at formulating appropriate training policy for Highway engineers to keep pace with technological developments the world over. It lays stress on creation of training cells in each of the engineering organizations to constantly evaluate the performance of the training programme and identify Officers to be trained and their training needs. NITHE (now IAHE) under Ministry of Road Transport & Highways (MoRTH) is designated to play a lead role with support from Central Road Research Institute (CRRI), National Institute of Construction Management and Research (NICMAR) and State Level Training Centers. Making use of Academic and Management Institutions for specialized courses has also been recommended. The Vision Document also recognizes the criticality of training of the cutting-edge-level of technicians and equipment operators. It envisages lead by the equipment industry and setting up of training centers in different regions. Documentation on review/ current status is not readily available.

CHAPTER 2

STATUS OF SKILL LEVEL OF WORKMEN

2.1 Generally five categories of workmen are identified. These are (i) Workmen employed by Government, (ii) Workmen employed by Construction Agencies, (iii) Casual Labour (sitting on Labour chowks or mandis), (iv) Unemployed Youth in Urban areas and (v) Unemployed Youth in Rural areas.

2.2 An estimation of workers engaged in the construction sector, according to the Report of the Working Group on Construction, constituted by the Planning Commission (now Niti Aayog) is as follows **(Table 2.1)**:

Table 2.1: Workers in Construction Sector

S. No.	Category	1995		2005		2011	
		Number	Share (%)	Number	Share (%)	Number	Share (%)
1.	Engineers	6,87,000	4.70	8,22,000	2.65	10,50,000	2.56
2.	Technicians & Foremen	3,59,000	2.46	5,73,000	1.85	11,25,000	2.74
3.	Secretarial	6,46,000	4.42	7,38,000	2.38	9,30,000	2.26
4.	Skilled Workers	22,41,000	15.34	32,67,000	10.54	37,27,000	9.10
5.	Unskilled Workers	1,06,70,000	73.08	25,600,000	82.58	3,41,68,000	83.34
	Total	**1,46,03,000**	**100.00**	**3,10,00,000**	**100.00**	**4,10,00,000**	**100.00**

It would be seen that there is significant increase in proportion of unskilled workers. Their number is well above 34 million. Such a huge number of unskilled workers is an indicator of the status wherein efforts are required on the part of all concerned towards remedying the worsening situation. It also indicates that there is a huge scarcity of skilled workers and practice of certification as empowerment criteria is practically missing. Even for operating a number of heavy equipment, no driving license is required not even for a Road Roller. The concept of skill development and certification of trained and qualified personnel below a diploma holder Junior Engineer is virtually absent. The objective of the skill development is to create a work force empowered with the necessary and continuously upgraded skills, knowledge and an internationally recognized qualification/certification to gain access to decent employment and ensure India's competitiveness in the dynamic global market. It also aims at increasing the productivity and employability of work force both in organized and in unorganized sectors, adopted to changing technologies and labour market demands.

2.3 Personnel employed as Engineers and at Sub-Graduate level could be considered to belong to the organized sector. Persons in the supervisory capacity positions and as workers fall largely into unorganized sector. It would be seen that the largest segment of industry remains employed in unorganized sector 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 performance of even those in the organized sector remains largely dependent on those in unorganized sector. The key focus therefore needs to be on building capabilities of the

construction industry to deliver the desired results and to cope with the envisaged work plans and deliver the infrastructure projects on time and with quality. Lack of this potential would mean additional cost, lack of durability and substantial reduction in our competitive position with respect to international players.

2.4 The construction industry by nature is dynamic and project oriented. Therefore, it cannot be handled in a typical assembly line manner as the manufacturing industry functions. The peculiarities and issues of construction industry have to be considered before deciding on the methodology and engagement for apprentices. This would equally help the road sector construction workers. The major issues are detailed as follows :-

a) The requirement, demand and employment is sector and project oriented and not as a common standard in manufacturing sector.

b) Mostly, the duration of engagement is short, varying from one to three years with exceptions in few cases.

c) Projects have difficult climatic, operational, boarding and lodging conditions.

d) There are mass requirements in a few selected trades but of shorter durations and in spurts.

e) Around ninety percent employment is either contractual or work output/ measurement basis leaving a small window for salaried employment.

f) The payments or salaries are not as per scale or standards across the industry but are based on the requirements, output and level of skills acquired.

g) Mobility and turnover of manpower is fast, varying between three months for workmen class to a few years for Supervisors and Engineers.

h) The majority skill workers requirement that is 75% to 80% is restricted to a few Job roles/ trades only, in any typical project of Real Estate, Power Plant, Road, Bridge etc.

i) Foremen and Supervisors at higher levels that is Level 5 & 6 are supposed to have multi-trade exposure unlike manufacturing sector.

j) Moving up in the promotion pyramid shall require additional skills of leadership and management in handling large group of labour force in addition to material and logistic planning.

CHAPTER 3

INITIATIVES FOR SKILL DEVELOPMENT UPTO 11TH FIVE YEAR PLAN (MARCH 2012)

3.1 In the 1950s and 60s, Govt. of India focused on setting up heavy industries through Public Sector Units. This created demand for skilled manpower at various levels. Thus ITIs, Polytechnics and Engineering Colleges including IITs and NITs were set up across the country. Technical institutions especially at the lower levels were oriented towards the organized manufacturing and capital goods industry. These ITIs and Polytechnics have been meeting the requirement of our industry quite effectively. However, with changing pattern of requirements, the employment demand has also changed. The demand is more from unorganized sector due to infrastructure development. There is a shift in employment pattern of traditional trades from permanency to short term which is more project oriented and entrepreneurial in nature.

3.2 The Apprenticeship Act, 1961 was enacted at that time keeping in mind the requirements of skilled manpower for manufacturing industry. The Act has undergone reviews in 1973 and 1986 to bring Graduates, Technicians and Diploma holders under its ambit but mainly it still remained focused towards the manufacturing industry. Therefore, there is a need to have a relook so as to bring the Construction Sector Trades within this Act which can ultimately address the Infrastructural requirements and open up larger employment opportunities for the masses.

3.3 Skill Development Mission was launched during the Eleventh Plan period (2007-12) to impart skills to at least 50 million individuals in the engineering and non-engineering sectors by the end of the 12th Plan (2012-2017). It has been recognized that to ensure that skills match demand, special efforts are needed to ensure that employees and enterprises play an integral role in the conception and implementation of such training programmes, including managing Industrial Training Institutes (ITIs) and in the development of faculty. An enabling frame work is on the anvil that would attract private investment in such training schemes through Public Private Partnerships (PPPs). Mobilization of investment, setting up of ITIs to international standards, ensuring efficiency in operations and management and enabling post training empowerment will be primary responsibility of the private sector. The envisaged role of the Government would be to provide the enabling frame work and requisite financing especially in respect of weaker sections of the society.

3.4 National Skill Qualification Framework (NSQF) provides for following key elements:

a) National principles for recognizing skill proficiency and competencies at different levels leading to international equivalency.

b) Multiple entry and exit between vocational education, skill training, general education, technical education and job markets.

c) Progression path ways defined within skill qualification framework.

d) Opportunities to promote lifelong learning and skill development.

e) Partnership with industry/employers.

f) Transparent, accountable and credible mechanism for skill development across various sectors.

g) Increased potential for Recognition of Prior Learning.

3.5 In our country, there are 18 Ministries (shortlisted by the Planning Commission) which, in one way or other, are linked up with workers, their skill development and their welfare. Ministry of Road Transport and Highways is one of them. The Highway Development is mainly assigned to 3 Agencies, i.e., National Highways Authority of India (NHAI), State Governments and the National Rural Roads Development Agency (NRRDA) for PMGSY. The Border Roads Organization (BRO) is also entrusted with National Highways in a few areas. National Highways Authority of India is engaged in development, maintenance and management of National Highways(NH) entrusted to it. State Governments are responsible for the Highways and Roads (NH, SH, MDR, ODRs) in their States running within the State boundaries. The NRRDA, through State Government Agencies, is responsible for the development of Rural Roads under PMGSY. Development and management of urban roads is carried out by the respective State Government or the Municipal Bodies/Cantonment Boards.

3.6 Recognizing that skill gap needs to be addressed through comprehensive efforts at various levels and catering to different needs of the society and the industry, the Government of India adopted skill development as a national priority. The Eleventh Five Year Plan detailed a road map for skill development and favored the formation of Skill Development Missions, both at State and National Levels. A three-tier institutional structure consisting of the Prime Minister's National Council on Skill Development (PMNCSD), the National Skill Development Co-ordination Board (NSDCB) and the National Skill Development Corporation (NSDC) was created in the year 2008. Thus, the three-tier structure was created to facilitate implementation of skill development through three main channels- Central Ministries, the State Governments and private/public training organizations. The main functions of the PMNCSD were outlined as follows:

a) Develop a strategy for skill development at the national level, along with variations at the State Level.

b) Map the gaps in the area of skill development and develop strategies to address the skill deficit.

c) Identify new areas for employability and promote skill development in such sectors.

d) Advise on remodeling of existing skill development programme run by various Ministries.

e) Promote greater use of Information Communications Technology in the area of skill development.

f) Develop and implement an action plan for skill development to maximize job generation within the country and create human resources for global needs.

g) Provide guidance through PM's National Council on Skill Development for activities to be undertaken by the Centre and the States and by the National Skill Development Corporation.

3.7 The National Skill Development Policy, 2009 recognized the need for National Qualification Framework (NQF) in our country that would stimulate and support reforms in skill development and facilitate establishment of nationally standardized and acceptable, International comparable qualifications. According to a publication 'To The People' brought out by National Skill Development Agency in August, 2013, various points came across, during an India-EU Conference held in May, 2013 as the rationale for a unified skill qualification framework. This

should serve a useful purpose for strategy developers including those in road sector. These points are given below:

a) National Qualification Framework (NQF) are often seen as a solution to many problems in the education and training systems in a country. However, it has to be noted that developing an NQF alone is not sufficient. In fact, many countries with NQF have realized that many other supporting things were required for ensuring that problems do not arise.

b) It takes time to develop an NQF and once developed, it also evolves. So it is not an overnight improvement/solution.

c) Coordination/cooperation from various bodies is required – regulators, training providers, employers, Government Bodies, Curriculum Developers etc.

d) Success of NQF depended on whether employers were using these frameworks for hiring decisions. It would truly work only when evidence suggests that investment in education and training was actually reaping returns in some tangible form – for the industry as well as the workers.

3.8 Need for Skill Development Initiative Scheme (SDIS) – A majority of Indian workforce does not possess marketable skills, which is an impediment in getting decent employment. Only 10% of Indian labour force – 8% informally and 2% formally acquire vocational skills. There is acute shortage of seats for training of workforce. The educational entry requirement and long duration of courses of the formal training systems are some of the impediments for a person of low education attainment to acquire skills for his livelihood. Thus, SDIS can cover Unorganized sector. The scheme covers all those above the age of 14. This applies equally to the requirement of road sector.

3.8.1 *Skill Development Initiative Scheme (SDIS)* – Concept of Skill Development Initiative on Modular Employable Skills (MES) was developed by Director General of Employment & Training(DGE&T) with close coordination of industry and State Governments. MES is "Minimum Skill Set", sufficient to get an employment. MES allows skills upgradation/ formation, multi-entry & exit, vertical and horizontal mobility and lifelong opportunity in a flexible manner. The skill is to be assessed by Assessing Bodies mainly from the Industry and Organizations. National Council on Vocational Training (NCVT) issues certificate of skills acquired through informal means/ competency assessment. The Central Apprenticeship Council (a statutory body) and the National Council on Vocational Training (a non-statutory body), advise the Govt. of India on policies, procedures, standards and norms for vocational training schemes.

3.8.2 *Features of Skill Development Initiative Scheme (SDIS)* – Key features of the scheme are that demand driven short term training based on Short Term Courses/Modular Employable Skills (MES) are identified in consultation with the industry. The Central Government facilitates and promotes training while industry provides training through Training providers. Courses are available for persons having completed studies upto 5th standard onwards. Public Private Partnership (PPP) is envisaged in the form of active participation of industry/ private sector in every stage of design and implementation of the scheme.

3.8.3 *Curriculum Development Process* – Sector based employable skills are identified in consultation with the industry, employers', organizations, experts from International Labour Organization(ILO), World Bank, Central Govt./State Governments Establishments etc. Training modules are identified corresponding to skill set/competence. Modules in the Course Matrix

are organized indicating vertical and horizontal mobility. Detailed Curriculum developed by Trade Committees and after approval of NCVT, is incorporated in the SDIS. The NSDC/DGE&T has provided guidelines for the selection of Vocational Training Providers and guidelines for assessment. Besides, a list of MES courses has also been worked out by NSDC/DGE&T. The revised list issued in September, 2012, covers 72 sectors such as, Automotive Repair, Carpet, Khadi, Retail, Media, Brassware, Home Décor etc. Sector No. 25 is 'Construction' and covers 42 courses. Besides, there are number of courses on Construction **(Annexure 1)** and under other sectors related to Construction **(Annexure 2)**. The special feature of this listing is that each MES course has a code number. For example, under 'Sector 25 Construction', Course Sl. No. 530 has MES course code "CON 106", for Assistant Bar-Bender & Steel Fixer. For this course, minimum educational qualification is 5th standard, duration of training is 300 hours and test fee amount is Rs.800/-. All the MES courses are also graded. First grade course code starts with 1, the second grade course code starts with 2 and third grade course code starts with 3. For example, CON 101 is for Assistant Shuttering Carpenter & Scaffolder and minimum educational qualification is 5th Class. CON 201 is for System Shuttering Carpenter and minimum educational qualification for this MES courses is 5th Class plus CON 101.

3.8.4 *Implementation* – In order to maintain the quality of training uniformity all over the country, instructional media packages, are developed by the National Instructional Media Institute (NIMI) Chennai and uploaded on their website i.e. www.dget.gov.in/nimi. Besides, in order to maintain uniformity in quality of training, terminal competency assessment tools are prepared and placed on DGE&T website i.e. www.dget.gov.in/nimi. In order to maintain uniformity in assessment, an Assessment Manual was developed and put on the DGE&T website.

3.9 BOCW Act, 1996 and BOCW Welfare Cess Act, 1996 are important in the context of skill development of workmen including those for roads.

3.9.1 The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (BOCW Act, 1996) was promulgated on 20th June, 1996. The Building and Other Constructions Workers Central Rules were framed by the Central Government in 1998. Building and others construction workers are recognized as one of the most numerous and valuable segments of the unorganized labour in India. The work is characterized by its casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities. This Act has been made as a comprehensive Central Legislation for regulating their safety, health, welfare and other conditions of service.

3.9.2 Building and Other Construction Worker's Cess Act, 1996 is complementary to BOCW Act 1996, provides for levy and collection of a Cess on the cost of construction incurred by Employers for augmenting the resources of Welfare Boards constituted by State Governments under the BOCW Act 1996. State Governments and U.T. Administrations are required to implement different provisions of this Act.

3.9.3 Most important point to note is that the Central Building and other Construction Workers Advisory Committee considers skill development of construction workers as part of worker's welfare activity. Therefore, State Governments and Union Territories can utilize part of welfare fund for skill development. State Government can pay for wages of workmen during

training as also expenditure for training from this fund. Some State Governments have already initiated action for funding of training from the Cess.

3.10 Recognition of Prior Learning (RPL) of Construction Workers is necessary. Construction activity creates physical assets in a number of sectors including Roads Sector. Many upstream economic activities depend upon this sector. To enhance productivity and employability of construction workers, the Ministry of Labour and Employment undertook an initiative to recognize, upgrade and certify the informally acquired skills of construction workers from the organized and unorganized sectors. However, these workers required some formal training in order to obtain a national recognized certificate which would also improve their mobility in labour markets, in addition to increase in productivity and better wages. Ministry of Labour and Employment formally approved, a scheme for Recognition of Prior Learning (RPL) of construction workers. The RPL Scheme envisages pre-training assessment led measurement and certification process for validating current skills of the construction worker registered with BOCW, fifteen day long gap-training (in trade and supporting competencies) followed by final assessment leading to NCVT certification. This training would align to the National Skill Qualification Framework (NSQF) and incorporate the trade wise competencies designed in the National Occupational Standards (NOS). This initiative would have participation from Training and Assessment Partners along with industry partners. The programme was anchored by DGE&T and the State Construction Welfare Boards. Empanelment of Training Providers and Assessing Bodies was to be done centrally by DGE&T. In order to ensure quality of training and assessment, a Committee was set up by the Ministry with representation of the States Governments to empanel Training Providers and Assessing Bodies having good track record. The Ministry of Labour and Employment (MoLE) informed all the State Labour Departments about this scheme in October, 2014. Both Workmen Training and Apprenticeship training were shifted from Ministry of Labour and Employment (MoLE) to Ministry of Skill Development and Entrepreneurship (MSDE) in April, 2015.

CHAPTER 4

FURTHER INITIATIVES FOR SKILL DEVELOPMENT

4.1 Skills Strategy

4.1.1 India is one of the youngest nations in the world with more than 62% of its population in the working age group (15-59 years), and more than 54% of its total population below 25 years of age. To reap this demographic dividend, India needs to equip its workforce with employable skills and knowledge so that they can contribute substantively to the economic growth of the country. Our country presently faces a dual challenge of paucity of highly trained workforce, as well as non-employability of large sections of the conventionally educated youth, who possess little or no job skills. Ministry for Skill Development and Entrepreneurship (earlier Department of Skill Development and Entrepreneurship notified in July, 2014) was set up in November, 2014 to give fresh impetus to the Skill India agenda and help create an appropriate ecosystem that facilitates imparting employable skills to its growing workforce over the next few decades. Apart from meeting its own demand, India has the potential to provide skilled workforce to fill the expected shortfall in the ageing developed world. As India moves progressively towards becoming a global knowledge economy, it must meet the rising aspirations of its youth. This can be partially achieved through focus on advancement of skills that are relevant to the emerging economic environment. The challenge pertains not only to a huge quantitative expansion of the facilities for skill training, but also to the equally important task of raising their quality. For a skills strategy to be successful, it should be complemented by commensurate creation of jobs in the primary, secondary and tertiary sectors which will be a key outcome of overall economic growth including entrepreneurship cutting across all sectors including roads.

4.2 National Policy on Skill Development and Entrepreneurship, 2015

4.2.1 Given the vast paradigm shift in the skilling and entrepreneurship ecosystem in the country and the experience gained through implementation of various skill development programmes, there was an imminent need to revisit the Skill Development Policy 2009 to align the policy framework with the emerging trends in the national and international milieu. National Policy for Skill Development and Entrepreneurship 2015 supersedes the policy of 2009. The primary objective of this policy is to meet the challenge of skilling at scale with speed, standard (quality) and sustainability.

4.2.2 Skill India is initiative of the Government of India to empower the youth of the country with skill sets which make them more employable and more productive in their work environment. The Skill Mission was launched by the Hon'ble Prime Minister on 15th July, 2015. The annual skilling needs in the country was estimated at around 7 million in 2014. In the current landscape, capacity is being created by private sector training organizations, industry inhouse training, government and private Industrial Training Institutes (ITIs), Advanced Training Institutes (ATIs), tool rooms and in schools, colleges and polytechnics. For all existing and new capacity that will be generated, the focus will move from inputs to outcomes of skill training that include employability and placements of trainees. 'One Nation One Standard' should become the mantra to ensure that national standards and quality for skilling are globally aligned and Indian youth can aspire

to secure local, national and international job opportunities. Quality of training can be measured by competency outcomes and employability of trainees.

4.2.3 A nationally integrated education and competency based skill framework was set up to provide for multiple pathways, horizontal as well as vertical, within vocational education, vocational training, general education and technical education, thus linking one level of learning to another higher level. This would facilitate both horizontal and vertical mobility with formal education on outcome based equivalence linked to a uniform credit framework. Sector Skills Councils (SSCs), as industry-led bodies, were set up by making them more representative, expanding their outreach and increasing their efficiency. The development of National Occupational Standards (NOS) and Qualification Packs (QPs) for various job roles in a sector are the key responsibility of the SSCs. The outcome standards for each job role is needed to be clearly defined and notified as per NSQF. SSCs will be responsible for ensuring that persons trained as per NOS/QPs are employed by employers in their sector.

4.3 National Skill Development Corporation (NSDC)

4.3.1 The National Skill Development Corporation (NSDC) is a one of its kind, Public Private Partnership (PPP) model in India, under the Ministry of Skill Development & Entrepreneurship (MSDE). It aims to promote skill development by catalyzing creation of large, quality and for-profit vocational institutions. A not-for-profit company set up by the Ministry of Finance, under Section 25 of the Companies Act, it has an equity base of Rs.10 crore, of which the Government of India holds 49% share, while the private sector has the balance 51%.

4.3.2 NSDC provides funding to build scalable and profitable vocational training initiatives. Its mandate is also to enable support system which focuses on quality assurance, information systems and train the trainer academies either directly or through partnerships. NSDC acts as a catalyst in skill development by providing funding to enterprises, companies and organisations that provide skill training. It also develops appropriate models to enhance, support and coordinate private sector initiatives. The differentiated focus on 40 sectors under NSDC's purview and its understanding of their viability will make every sector including roads attractive to private investment.

4.4 Sector Skill Councils (SSCs)

4.4.1 Sector Skill Councils are set up as autonomous industry-led bodies by NSDC. They create Occupational Standards and Qualification Packs, develop competency framework, conduct Train the Trainer Programs, conduct skill gap studies and assess and certify trainees on the curriculum aligned to National Occupational Standards(NOS) developed by them. Till date, the NSDC Board has approved proposals for 40 Sector Skill Councils. There are approximately 450 Corporate Representatives in the Governing Councils of these SSCs.

4.4.2 Development of National Occupational Standards (NOS) and Qualification Packs (QPs) for various job roles in a sector is the key responsibility of the SSCs. The outcome standards for each job role are clearly defined and notified as per NSQF. SSCs will be responsible for ensuring that persons trained as per NOS/QPs are employable by employers in their sector. Development of Standards by SSCs will be under the aegis of National Skills Qualification Committee (NSQC)

under NSQF. All NOSs and QPs developed by the SSCs will be examined and reviewed by the NSQC and thereafter, conferred the status of 'National Standards'. All skill training in the country will necessarily align itself to these national Standards.

4.4.3 *Recognition of Prior Learning (RPL)* – RPL is the key instrument which can help map the existing skills in the unorganized sector and integrate the informal sector to the formal skilling landscape. The RPL framework is an outcome-based qualification framework linked to NSQF against which prior learning through formal/informal channels would be assessed and certified. The RPL process would include a pre-assessment, skill gap training and final assessment leading to certification of existing skills in an individual. The RPL certification would be at par with the certifications following various skill trainings in the country. It will provide both horizontal and vertical pathways to an individual for acquiring additional skills for better livelihoods. Adequate resources will be earmarked under various government schemes for equitable access to RPL programmes.

4.4.4 National Council on Vocational Training (NCVT), constituted in 1956, provides a national framework for setting curricula for various vocational courses, and also prescribes standards for equipment, scale of space, duration of courses, methods of training, conducting All India Trade Tests and awarding National Trade Certificates. NCVT will be further strengthened by scaling up industry representation through SSCs and laying down a national framework for all certification in the skill space through an autonomous body.

4.4.5 The Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is a flagship programme of Ministry of Skill Development and Entrepreneurship (MSDE). An outlay of Rs 12,000 crore to impart training to one crore people over the next four years (2016-20) has been envisaged. It is estimated that PMKVY will impart fresh training to 60 lakh youth and certify skills of 40 lakh persons acquired non-formally under the Recognition of Prior Learning (RPL). The scheme, completely aligned to the common existing norms, moves to a grant based model where the training and assessment cost would be directly reimbursed to the training providers and assessment bodies in accordance with the norms. Skill training would be done based on industry led standards aligned to the National Skill Qualification Framework (NSQF). Financial support to the trainees will be given in the form of travel allowance, boarding and lodging costs. Post placement support would be given directly to the beneficiaries through Direct Benefit Transfer (DBT). NSDC is the Implementing Agency and has prepared and released detailed Process Manual in May, 2015 for the guidance of all the stakeholders under the PMKVY to help in achieving the Scheme outcomes. It has been laid down in the Process Manual that SSCs interested in conducting training and assessments under PMKVY shall submit a letter to this effect to NSDC along with required undertaking/documentation. It will be responsibility of SSCs to finalize the job roles and related parameters for assessment/marking of candidates. SSCs shall also affiliate Training Providers (TPs) and register Assessment Agencies (AAs) and develop their monitoring plan for PMKVY. SSCs are also mandated to certify the candidates after successful completion of the assessment and validation of the candidates based on Aadhaar and thereafter NSDC shall disburse reward money. The reward money shall depend on the NSQF levels achieved viz. level 1 to 6 and the concerned skill sector of the training program viz. Manufacturing, Plumbing & Construction Sector or Other Sectors.

4.5 The Construction Skill Development Council of India (CSDCI)

4.5.1 The Construction Skill Development Council of India (CSDCI) is a Non-Profit Organization, registered under Section 8 of the Indian Companies Act, 2013 having Head Office at Delhi. This Council has been constituted under the mandate of National Skill Development Corporation (NSDC). It is supported and promoted by Confederation of Real Estate Developers Association of India (CREDAI), Builders Association of India (BAI), National Highway Builders Federation (NHBF), Construction Federation of India (CFI).

4.5.2 CSDCI aims to develop, establish, standardize and sustain "Industry Competency Frameworks", "Skills Levels", "Occupational Standards", "Create and deliver Capacity", Investment and "Skilling outcomes", which shall meet or exceed customer expectations through ethical, transparent and effective management of the Construction and Infrastructure Industry Skill Development Fund. CSDCI endeavors to establish, constantly monitor, update and sustain corporate values and ethics for all its participants, employees, industry members and related stakeholders with a vision to be the leading apex body of the Construction & Infrastructure Industry in Development and support of Skilling Solutions and advocacy of all connected Services for ensuring the skill needs of the Construction Industry.

4.5.3 The basic objective behind the formation of CSDCI is to create a credible and effective mechanism with the support of relevant and interested stakeholders to manage the task of skill development across the country and meet the current and future skill needs of the construction industry including roads. Role of CSDCI is as under:

a) To create Occupational Standards and Competency Levels for Job Roles (NOS & QPS).

b) To issue Guidelines and facilitate Training and certification of Trainers and Assessors.

c) To plan Skill Development to meet priority of Industry.

d) Accreditation and Affiliation of Trades Training Institutes.

e) Nodal agency for Assessments and Certification of Trainees.

f) To create and operate Labour Market Information System (LMIS).

g) Academies of Excellence.

4.5.4 CSDCI has developed 101 Qualification Packs under 17 Occupations along with Curriculum and Assessment strategy for Construction and Infrastructure Sector. Occupation, i.e. broad banding the area of skill, are defined for the construction sector as Masonry, Bar bending & Steel Fixing, Shuttering Carpentry, Scaffolding, Construction Electrical Works, Construction Painting, Quality Assurance and Quality Control, Rigging, Fabrication, Pre-stressing, Surveying, Roads & Runway Construction, Interior & Exterior Finishes, Draughting, Environment, Health & Safety(EHS), Store Keeping & Rural masonry. List of Qualification Packs is given at **Annexure 3**. The Qualifications Packs are Industry aligned and approved as per NSQF requirements. CSDCI is participating in all Government and Industry Programs, through its Training Providers and Assessment Agencies under various ministries.

a) Ministry of Skill Development & Entrepreneurship

b) Ministry of Road Transport & Highways

c) Ministry of Housing and Urban Affairs
d) Ministry of Rural Development
e) Ministry of Social Justice
f) All State Governments
g) CSR based training programs

4.5.5 It has also progressed in identification and affiliation of Skill academies and conducting Training of Trainers and Training of Assessors programs as per guidelines of NSDC. It has developed a good capacity of Trainers and Assessors of various QPs for training and assessments.

4.6 The Infrastructure Equipment Skill Council

4.6.1 The Infrastructure Equipment Skill Council (IESC) is a 'Not for Profit' organisation promoted by the Indian Construction Equipment Manufacturers Association (ICEMA) and supported by the Confederation of Indian Industry (CII) and funded by the National Skill Development Corporation (NSDC) to spearhead the skilling of workforce in the Infrastructure Equipment Sector with primary focus on training and certification of operators and mechanics.

4.6.2 The Council with 18 founding members from the ICEMA was formed in June, 2014 with the Memorandum of Association being formally charted and approved. In August, 2014 the Council was registered at Delhi under the Societies Registration Act 1865, and later in November, 2014 established its Head Office at Bengaluru (Karnataka). The Qualification Packs Developed by IESC are attached as **Annexure 4**.

CHAPTER 5

POLICIES PROMOTING SKILLING MISSION

5.1 National Policy for Skill Development and Entrepreneurship aims to provide an umbrella framework to all skilling activities being carried out within the country, to align them to common standards and link skilling with demand centres. In addition to laying down the objectives and expected outcomes, the policy also identifies the overall institutional framework which will act as a vehicle to achieve the expected outcomes. Skills development is the shared responsibility of the key stakeholders viz. Government, the entire spectrum of corporate sector, community based organizations, those outstanding, highly qualified and dedicated individuals who have been working in the skilling and entrepreneurship space for many years, industry and trade organizations and other stakeholders. The policy links skills development to improved employability and productivity in paving the way forward for inclusive growth in the country. The skill strategy is complemented by specific efforts to promote entrepreneurship in order to create ample opportunities for the skilled workforce.

5.2 It is envisaged that the objectives and targets under the National policy will be met in mission mode approach. The Mission is housed in MSDE and the key institutional mechanisms for achieving the objectives of the Mission is divided into a three-tier structure at the Centre to steer, drive and execute the Missions objectives. The Mission Directorate is supported by three other institutions: National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC), and Directorate General of Training (DGT). National Skill Development Agency (NSDA) which was set up as a Society in June, 2013 will focus on the two verticals of Quality Assurance and policy research in the skills space. National Skill Development Corporation (NSDC), a Public Private Partnership which was set up in 2008 will be the nodal organization for all private sector initiatives in the short term skilling space. The two verticals of Training and Apprenticeship Training under DGE&T, The Ministry of Labour & Employment (MoLE) have been shifted to Directorate General of Training, MSDE from 16th April, 2015. Its large institutional framework consisting of ITIs, ATIs, RVTIs and other national institutes will act as tools of execution for Mission activities.

5.3 The Ministry of Finance (Department of Economic Affairs), Govt. of India, through Gazette Notification dated 06.06.2013 decided that the National Skill Development Agency (NSDA) shall subsume the Prime Minister's National Council on Skill Development (created in July, 2008), the National Skill Development Coordination Board (NSDCB) and the office of the Advisor to PM on Skill Development. The NSDA was mandated to coordinate and harmonize the skill development efforts of the Government and the private sector to achieve the skilling targets of the 12th Plan and beyond. The Central Ministries and NSDC would continue to implement schemes in their remit. Another guideline to NSDA was that it would anchor the NSQF and facilitate the setting up of professional certifying bodies in addition to the existing ones. Specific functions as laid down in the notification were mandated to be performed by the NSDA.

5.4 The Ministry of Labour, DGE&T notification dated 04.03.2014 contained the accepted recommendations of the Working Group constituted to revamp all DGE&T schemes. The recommendations primarily focused on method of admission criteria, training/skill upgradation

of trainers, filling up of vacancies against sanctioned posts, setting up of new ITIs where density was less than the national average, especially in trades where private sector was not willing. Another important accepted recommendation for implementation was about ensuring quality in availability of manpower for jobs of Paper Setters, Examiners, Moderators, Tabulators and Checkers etc. by creating a pool of qualified persons through a transparent process of inviting online applications. For assessment of practical examination, retired instructors of ITIs as well as workshop faculties of polytechnics could be empaneled as assessors and prepared for assessment procedures. Further, in order that the ITIs continue to satisfy laid down norms, a process of re-affiliation after a certain number of years, with annual targets has been prescribed in the notification.

5.5 Public funds (funding by Central Government, State Governments and Grant based schemes) are finite and will not be able to cover the magnitude of the challenge of Skilling India. Hence additional sources of funds are required. Therefore, all stakeholders, the Government both at Centre and States, the enterprise both public and private, and the direct beneficiary (the individual), would contribute in mobilizing financial or in-kind resources for skill development. The success of the policy will depend upon the quantum of resources mobilized from all stakeholders.

a) National Skill Development Fund (NSDF) has been set up by Government of India with the objective of encouraging skill development in the country. A public Trust set up by Government of India is the custodian of the Fund. The Fund acts as a receptacle for all donations, contribution in cash or kind from all Contributors (including Government, multilateral organizations, corporations etc) for furtherance of the objectives of the Fund.

b) To channelize the interest of a plethora of organizations to participate in the mission of Skill India, a strategic vehicle to create a multiplier effect on skilling has been devised. It will serve as the aggregator vehicle for pooling the funds of multilateral agencies, companies, foundations, NGOs and individuals for skilling interventions by leveraging existing infrastructure and resources. The platform will also be subjected to timely audits to ensure that the contributions are used for the intended purpose.

c) To attract funds from Industry, Companies will be encouraged to spend at least 25% of their Corporate Social Responsibility (CSR) funds on skill development initiatives directly or through NSDF. Further, industry should earmark at least 2% of its payroll bill (including for contract labour) for skill development initiatives in their respective sectors. These funds can be channelized for skill development activities either through respective SSCs or through NSDF.

d) All Government schemes across sectors will be encouraged to apportion a certain percentage (10%) of the scheme budget towards skilling of human resources in local regions in the required sector. These funds could be used for implementation directly or be routed through NSDF. Government may consider other options including cess etc. to raise funds for meeting the requirements of this sector.

e) End user funding through a basic fee paying model will also be a key medium for funding training activities. However, the Government believes that the inability to pay training costs should not stop any desirous citizen in the country from acquiring any certified skill training. The Government will promote grant of

scholarships, rewards and Skill Vouchers (SV) for funding of training costs as provided in the Policy document. It will also be ensured that for all government schemes, Direct Benefit Transfer (DBT) will be used as a mechanism for payment disbursement.

f) A Credit Guarantee Fund for Skill Development and a National Credit Guarantee Trustee Company (NCGTC) has been set up to support the initiative of loans for the purpose of skilling and will be used to leverage credit financing in the skill landscape. It will be further expanded to ensure greater outreach and access to all citizens. Similarly, a Credit Guarantee Fund for Entrepreneurship Development worth Rs. 3000 Crore per year has already been initiated under Prime Minister MUDRA Yojana through NCGTC.

5.6 Incentives by the Government

5.6.1 National Service Scheme (NSS) is a vehicle which can engage students in real, long term projects partnering with other stakeholders in society – NGOs, Corporates through their CSR, Foundations and Educational Institutions themselves. NSS has the potential to become a youth movement in which youth give time to social issues and acquire skills that enhance their employability.

5.6.2 Weighted deduction of the expenditure incurred on Skill Development under Section 35CCD of the IT Act. The Finance Act, 2012 has inserted a new section 35CCD in the IT Act which provides for a weighted deduction of 150% of expenses (other than land or building) incurred on skill development project notified by the Board in accordance with the guidelines. At present, Companies engaged in manufacture sector were included, later on Companies operating in service sector are also eligible. The National Skill Development Agency (NSDA) has been declared as the nodal agency for evaluating the applications made by eligible companies for availing this to the Central Board of Direct Taxation (CBDT).

5.6.3 *Funding of Skill Development activities* – Large sums of money have been collected by State governments from construction projects through the Building and Other Construction Workers Cess. As per clarification issued by Ministry of Labour and Employment on 21.05.2012, the expenditure incurred towards various activities of the Skill Development Scheme will be funded from the Cess collected under BOCW Act, 1996. The Government has also issued statutory directions in July, 2013 to the effect that 20% of the BOCW Cess funds would be utilized for skill upgradation or vocational training of construction workers and their family members. The expenditure of training, assessment fee and a wage compensation, currently @ Rs. 35 per hour to the worker to offset loss of wages during class room training and assessment, are paid by Welfare Boards from the Cess.

CHAPTER 6

FIELD OF ACTIVITIES IN ROAD SECTOR

6.1 Civil construction work is common for built environment and infrastructure sectors. For civil construction, manufactured goods and natural mineral products are brought to the project site. Workmen, Machine Operators and Supervisors of different trades carryout the work to implement the road project according to drawings and designs. By and large skills are currently acquired by workmen, hand-on and taking guidance from seniors. Generally, they do not undergo structured vocational education training in the related trade.

6.2 Comprehensive listing of trades, and in turn categories of workmen, is a difficult task on account of multifarious activities involved. Still, it is desirable to prepare a consolidated list of all categories of workmen involved in the road sector. It may not be possible to prepare a final list in the first instance. Therefore, listing has to be kept open ended so that as and when required, new categories can be added. Number of sub-heads for training under the road sector will have to be developed.

6.3 Sub-heads for Road Sector – Sub-heads for road sector are to be developed in judicious manner. The development of sub-heads can be Qualification Pack/Trade oriented and/or Process oriented. Besides, in specific cases these can be sector specific. A list of proposed sub-heads for roads is as follows: (a) Laboratory Testing/ Geotechnical and Material Investigations, (b) Topographic Surveys, Landscaping Schedules, (c) Land Schedules to facilitate process of land Acquisition, (d) Equipment/ Machine Operation like Road Rolling, Excavation Tunnel Boring, Pile Driving, Crane Operating etc., (e) Masonry, (f) Cement Concrete, (g) Bar Bending & Steel Fixing, (h) Form work, (i) Structural Steel Work/ Aluminum work (j) Road work including Concrete Pavement, (k) Sanitary installation/ Water Supply/ Drainage, (l) Welding, (m) Electrical/ Air-Conditioning/ Fire-fighting, (n) Environment, Health & Safety, (o) Horticulture/ Landscaping/ Water Harvesting/ Tree Plantation and (p) Specialist – Geosynthetic/ Signages/ Pre-stressing/ Post Tensioning/ Bearings/ Expansion Joints/ Reinforced Earth.

6.4 Listing of Categories of Workmen

The information about different categories of Qualification Packs for trades, supervisors, operators etc. has been taken from following sources:

i) Qualification Packs/Trades included in the CSDCI/DGE&T list under heads related to Highway Sector and Construction.

ii) Qualification Packs/Trades as per Standard Data Book of MoRTH and MoRD.

iii) CPWD Schedule of Rates.

iv) Other Agencies engaged in Road Construction.

v) Trades designated under Construction Sector as per Apprenticeship Act, 1961.

6.5 An attempt has been made to prepare a comprehensive list of different categories after consulting documents of MoRTH, CPWD, Ministry of Rural Development and others involved in road construction. Categories of workmen listed in the MoRTH Data Book is not exhaustive. The nomenclatures adopted by DGE&T should prevail for the sake of uniformity across the road sector. While the CSDCI/ IESC list has been extracted from the construction related activities therein, lists of other departments/agencies are for either road works or building works. Thus, there is enough scope to add additional categories in other sectors at appropriate time. Besides, some categories not included in above lists have been added. Currently many patented items are also in use for which manufacturers provide the installation without which warranty is not applicable. Such specialized categories of workmen are not included in the list.

6.6 Different categories are to be listed under proposed sub-heads. If there is difference in the nomenclature for the same category of workmen in different lists, the nomenclature given in CSDCI list has to prevail and clarification notes to be given along with the list regarding difference in nomenclature with other lists, if any. Following seven lists have been prepared.

a) **Listing of Courses:** List of Courses extracted from Modular Employable Skills (MES) prepared by DGE&T / CSDCI / IESC and also approved by NCVT/NSQC. **Annexure 1** and **Annexure 3** lists out courses related to construction sector or primarily civil engineering field. **Annexure 2** included MES courses, also prepared by DGE&T, relates to other sectors but essentially required during execution of road projects. The list includes fields like electronics, fabrication, material management, security etc. This list also indicates minimum educational qualification and Modular Employable Skill (MES) required for enrolment to a particular course. **Annexure 4** lists out qualification packs prepared by the IESC in the operator and mechanic categories. The DGE&T and CSDCI lists also include duration of the training courses. Fee payable are as per common norms issued by the Government.

b) **Consolidated List of Categories:** Consolidated List of Categories available in documents of MoRTH, CPWD, Ministry of Rural Development (MoRD) and others involved in road construction has been compiled for Supervisors/ foremen and given in **Annexure 5**, and that for workmen in **Annexure 6**. In **Annexure 6**, asterisk marked categories are similar (in a few cases with slightly different nomenclature) to courses in **Annexures 2 & 3**. To this extent there is some overlap. Courses for these categories are required to be developed on lines similar to those prepared by DGE&T / IRC / CSDCI / IESC. MoRTH and MoRD can take a lead in this matter by engaging suitable agencies.

c) **Trades / QPs Designated under Construction Sector as per Apprenticeship Act, 1961 :** The typical construction trades designated under Apprenticeship Act, 1961 for ITIs are more or less biased towards the typical workshop floor practices. Their institutional training duration need to have on the job project site training which shall be covered under apprenticeship training. On the other side, the workmen entering through RPL/MES route are exposed to project sites and

need structured training for which the training centers at project sites shall take care. The suggested levels of certification for trades already approved under the Apprenticeship Act have been compiled and given in **Annexure 7**.

d) Certain ancillary categories like security, accounting, storekeeping etc. which provide support to the construction agencies for smooth implementation have been included in these Annexures. Training in these fields, though may not be in the complimentary list, would enhance efficiency where deployment of such categories is made mandatory under the agreement.

CHAPTER 7

PROVISIONS IN VARIOUS CONTRACT DOCUMENTS

7.1 In standard contract formats of all the departments in the country, there exists a provision for deploying only skilled workers but it is not defined therein, how a worker will be judged for his skills. In the absence of certification, only choice left to a worker is himself defining his skills and there is no option for the contractor or engineer, but to rely on him. Many times, in the race of getting a suitable job, worker may not be suitably qualified, but he will project himself of being capable of handling high-tech jobs without even realizing the sensitiveness of the job, he is going to handle once put in position. A few contract provisions relating to contractor's personnel are as below: -

a) In FIDIC conditions of contract, the provisions regarding contractors' Superintendence (Para 6.8), Contractor's personnel and records are in **Clauses 6.9** and **6.10**. Text of these provisions is given in **Annexure 8**. There is difficulty in implementation of this clause as there is shortage of trained and certified workmen at present.

b) **CPWD Conditions of Contract – Clause 19 K** of CPWD Contract provides for employment of qualified tradesmen not less than 20% of each trade for all contracts exceeding Rs. 5 crore. A few institutions like CPWD Training Institute, ITIs, NICMAR, CIDC and similar institutions recognized by Central / State governments are recognized for certification. The text of this clause is given in **Annexure 9**.

c) MES Conditions of Contract relating to deployment of qualified workmen appears as **Clause 26**. The Clause provides that number of qualified tradesman shall not be less than 25% of the total in each trade. The text of this **Clause** is given in **Annexure 10**.

d) EPC Agreement, **Clause 3.4.1**, provides that contractor shall ensure that personnel engaged by it or by its Sub-Contractors in performance of its obligations under this Agreement at all times are appropriately qualified, skilled and experienced in their respective functions in conforming with Good Industry Practice.

e) Model Concession Agreement for Annuity Based Project, provides that Good Industry Practice means the exercise of that degree of skill, diligence, prudence and foresight in compliance with the undertaking and obligations under this Agreement which would reasonably and ordinarily be expected from a skilled and experienced person engaged in implementation, operation and maintenance or supervision or monitoring there of or any of them of a project of the type similar to that of the project. Further **Clause 5.4 (a), (v)** and **(vii)** gives the requirement and importance of periodical tests. These tests can be conducted by a competent, properly qualified and certified Laboratory Assistant.

7.2 While there is provision of employing skilled workmen in the Government Contracts, but the actual situation is different. Therefore, to meet the objective, the next step can be to send the already deployed workmen for training and get them certified. After such arrangements are

made, then with the passage of time, it will be observed that a large number of workmen are certified and skilled workers will be available on the job. Again, the problem arises as to how to bind the contractor to send the deployed workmen for the training since it amounts to paying the worker not for the job at site but paying for his training. No contractor will agree to this proposal, unless there are suitable compensation means for assuring their absence from work, though in the long run it will be beneficial to the contractor by way of better workmanship and increased output. One of the options is making such provisions in the bid document itself before commencing the procurement process. Otherwise, there can be a provision for incentive to contractors for providing training to the workers deployed by them. There can also be a provision in the agreement that the workmen deployed can undergo the essential training within a limited period, say within 3 months, failing which the workmen will not be allowed to continue on the job. Side by side, arrangements need to be in place for strengthening the infrastructure and faculty of the Training Providers.

CHAPTER 8

EXISTING TRAINING FACILITIES

8.1 As the magnitude of infrastructure development picked up pace, acute shortage of trained and skilled manpower was felt in the country. Maintaining of quality and speed of construction for the fast growing and evolving construction industry as well as pressure of employability of the huge work force led a few organizations to start training of workmen even prior to the launch of Skill Development Mission in the Eleventh Plan. Brief details of some of these initiatives is given below.

8.2 National Academy of Construction (NAC), Hyderabad

Recognizing that construction is one such area where technology is developing at a fast rate and one needs proper understanding of the technology and importance of proper training, the NAC was established in Hyderabad at the initiative of the Government of Andhra Pradesh in the year 1998 for bringing overall development in the Standards of the Construction Industry in India. The State Government has allotted over 46.46 acres of land for constructing the NAC campus. The Institution runs based mainly on voluntary contributions of Builders Association of India of Andhra Pradesh Chapter. According to State Government orders, 0.1% of the estimated cost of all works in all Engineering Departments and Corporations in the State is to be deposited periodically with National Academy of Construction. It is registered as a Society and incorporated as Public Charitable institution. Starting with one centre and five trades and training 150 technicians per year, NAC has grown to 110 centres throughout Telangana and Andhra Pradesh States and 21 trades today with target of training 1,00,000 technicians per annum. For Administrative convenience, NAC has created six regional centres which are also headed by Regional Directors, Assistant Directors appointed in each district for better co-ordination and Quality control of the training programs. To augment and play an effective role, NAC is now establishing three Zonal centres with a capacity of 2000 trainees per annum in each Zonal Centre. According to NAC, these Advanced Skills Training Institutes (ASTI) are expected to become the future hubs of trades training.

The NAC offers Construction Trades Training (90 days) with facility of free boarding and lodging and visit to Project Sites. The training is structured to equip unskilled workers with basic skill, coupled with hands on experience enough to begin a career as qualified construction technicians. Minimum age is 18 years. Different basic qualification is required for eligibility for training in different courses. On completion of training, NAC awards a certificate to the successful candidate, thus enabling him to obtain employment anywhere in the relevant trade. Successful trainees are also assisted in securing employment in private sector construction industry. The training is offered, among other in the fields related to Civil construction such as General Works Supervisor, Highway Works Supervisor, Land Surveyor, Store Keeper, Formwork Carpentry, Masonry, Bar Bending, Welding. The NAC also offers Skill upgradation training programmes, in the fields of Formwork Carpentry, Masonry, Bar Bending and Welding. Duration of such courses is usually 15 days.

8.3 Construction Skills Training Institutes (CSTIs)

8.3.1 Larsen and Toubro Co. (L&T), has been playing a key role in creating skilled labour through its Construction Skills Training Institutes (CSTIs) that are spread across the country. L&T began to promote Construction Vocational Training (CVT) in India by establishing a Construction Skills Training Institute (CSTI) in late 1995 at Chennai. CSTI has been developing skilled workforce through structured training. Such structured training enables both new entrants and less experienced workers in the industry, progressively improve their knowledge and competencies in the respective trades. Construction Skill Standards are formulated for different trades after carefully analyzing the knowledge and the skill expected for each level of competency. In addition, different trade tests have been specified to assess the knowledge and skill level obtained. The Construction Skills Training Institute (CSTI) has campuses at Chennai, Mumbai, Ahmedabad, Bangalore, Hyderabad, Kolkata, Delhi and Cuttack for Practical and Class Room Training. One CSTI is under development at Nagpur, especially for Road construction training.

8.3.2 The organization considers that skill upgradation is necessary so that a worker can move upwards in the career path of the organization. In the overall career map, labour segment has three levels; Helper, Assistant and Skilled Worker. In the supervisor segment, another three levels are there; Charge Hand or Highly Skilled, Foreman and Supervisor. Thereafter managerial segment starts. Occupational Standards (OS) are taken from Qualification Packs of CSDCI. Outcomes are laid down for each job which describes what individual needs to know and understand in order to carry out a particular job, role or function. These are also the performance standards that individuals must achieve when carrying out functions in the work place, together with specification of the underpinning knowledge and understanding. The following briefly describes the training process which is aligned to the National Skill Qualification Framework (NSQF) and incorporates the trade wise competencies designed in the National Occupational Standards (NOS);

i) **Location of Training Centres:** The Training Centres are located either zonal wise or as per the project cost. Since road projects are linear in nature it is advisable that these Training Centres are at the mid location or at place where other logistic concentration is there.

ii) **Faculty:** The suitable faculty are the retired or old technicians who have worked in the field. However, they need to undergo a trainer's course for at least 15 days. As far as modern technology is concerned, the faculty for the same has to be pooled in from the main dealers or manufacturers.

iii) **Basis of Selection of Trainers:** The criterion for selection of trainees is based on the type of requirements i.e.

   a) Road Layer Level-1 can be a person with minimum literacy and having some construction experience as labourer on road work.

   b) Road Layer Level-2 can be a person having minimum experience of two years after passing Level-1 certification and education level can be high school fail or equivalent.

c) Road Layer Level-3 can be a person with three years of experience after passing Level-2 or a high school pass with at least two years of experience on Road Works.

iv) **Wages during Training:** The wages during training is governed by the Minimum Wages Act for that area. During training, the cost per Trainee generally works out to Rs. 30/- per hour which includes consumables and faculty etc.

v) **Syllabus:** The syllabus is developed as per National Skill Qualification Framework (NSQF) Levels in the form of Qualification Pack (QP) & National Occupational Standards (NOSs) which is mandatory as per the Government Gazette Notification.

vi) **Assessment of Skill Level and Gap Analysis:** It is outsourced.

vii) **Trade Test & Certification:** It is done by CSDCI/DGT, Ministry of Skill Development & Entrepreneurship, Govt. of India under Skill Development Initiative (SDI) or Recognition of Prior Learning (RPL) scheme.

8.4 Central PWD Training Institute

The CPWD Training Institute is looking after the training needs of Engineers, Architects, Horticulturists and Workers. The main Institute is located at Ghaziabad. Regional Training Institute and Workers Training Centres are located in the four metros i.e. Delhi, Mumbai, Kolkata and Chennai.

The Regional Training Institutes conduct training courses for Group 'B' and 'C' Officials. Workers Training Centres are part of the Regional Training Institutes. These impart skill improvement training to workers and Group 'D' staff. The skill development courses for workers is held in association with Construction Industry Development Council (CIDC). After completion of the training, certification of the workers is also done through IGNOU.

8.5 Skill Development and Training Programmes of Central Government

8.5.1 The NITI Aayog has listed out 17 Ministry/Departments which are imparting Skill Development and Training Programmes of the Central Government in various fields. The list shows Ministry/ Department wise Schemes or Programmes, Institutions having provision for Vocational Education and Training Programme, Target Group and Duration of Training (long-term or short-term). Though the list includes Ministry of Rural Development, Ministry of Housing and Urban Affairs, Ministry of Labour, for Construction Sector, it lists HUDCO and others as having 640 Building Centres (HUDCO), Company run schools (NBCC, HCC, L&T, ECC etc.) & association etc. The target group includes persons engaged in Construction Industry Worker and Supervisor having qualification of 5^{th} to 12^{th} Standard. Duration of the courses is Short Term Courses lasting 1 month to 6 months. The PMKVY 2.0 was launched in 2016. The scheme requires the training centres to be uploaded and approved through the SMART NSDC portal i.e. http://www.smartnsdc.org. Under PMKVY programs CSDCI has nearly 250 Training Centres across country for training of various trades/QPs.

8.5.2 Under PMKVY 2.0, RPL program was launched for those workers, who already possess the skill. However, recognition and certification of such workers are required to be done based on NSQF level. Under the RPL program, training/orientation duration varies from 12 to 80 hours and are carried out in three types (Type 1- Camp Based, Type 2 – Site Based and Type 3- Training Center Based).

CHAPTER 9

APPRENTICESHIP FOR CONSTRUCTION SECTOR INCLUDING ROADS

9.1 Considering the peculiarities and issues involved in the Construction Sector, including roads, some important issues related to apprenticeship programme are to be considered. It is likely that this may require modification in the Apprenticeship Act, 1961. Besides, it is suggested that for a few years, the apprenticeship programme be directly coordinated by the Ministry of Skill Development & Entrepreneurship, Government of India in consultation with respective State Government, Employers i.e. Contractors in Construction Sector as the latter are not likely to invest for training of temporary employers as they are hired for duration of project. Therefore, Government support in the form of stipend to workers and supervisors is considered necessary. The apprenticeship training is to be imparted by the nominated company and the assessment, testing as also certification has to be done by third party having industry Experts, DGT Officials and Independent Observers. Training Centres are to be established by developer/company/ contractor at project sites. Besides, construction companies having large workshop of plant and machinery should be financially supported to establish Apprentice Training Centre for Operators and Machines, as required by the Industry.

9.2 The trade training modules to be based on Qualification Packs (QP) and National Occupational Standards (NOS) for various job roles at different work duly approved by the Government. A typical hierarchy pyramid for construction trade is given in **Annexure 11**. The movement of job roles is given in **Annexure 12** and typical flow chart of Apprenticeship Engagement is given in **Annexure 13**.

9.3 The apprenticeship should be for three levels as under:

a) Graduate Engineers Training (GET) for six months;

b) Supervisory level for six months;

c) Workers level or Tradesmen levels for 12 months.

Government should give at least 75% cost of stipend. This should cover cost of training, faculty, establishing the Training Centre, Consumables, productivity loss, uniform and Personal Protective Equipment (PPE). The balance cost to be borne by the Employer engaging the apprentices. The number of Apprentices to be decided on the basis of manpower projection for the entire duration of the project, as per Contract Agreement. Number of apprenticeship can be 15% for worker's level, 25% for Supervisors level and 50% for GET level. It is suggested that apprentices at Worker and Supervisor levels should be monitored and controlled by DGT/ NSDC whereas that of Engineers should be monitored and controlled by Ministry of HRD. Apprentices from Institutes and Training Establishment are to be selected by Employer. Training centres at project site to be selected by a selection panel nominated by the Government. Consideration may be given to include one Government Representative, one from the Industry and an Independent Technical Observer, in the panel.

CHAPTER 10

BUILDING CAPABILITIES FOR TRAINING OF WORKMEN

10.1 Background

10.1.1 In order to accomplish the task of building capability in the road sector, skilled workmen (trained and certified) of different categories are required in huge numbers. The workmen are available but unfortunately most of these workmen are neither trained nor certified. This gap is affecting both quality and productivity. By and large, workmen do not possess required skills and they lack knowledge in their field of activity. The only way out is to develop required skills and provide knowledge base by imparting basic education and training to workmen and thereafter give them trade test to certify them for the required level.

10.1.2 Existing provisions in the contract documents are not effective in dealing with this situation. Therefore, there is a need to have a specific provision in the contract documents and its strict enforcement. As the prime co-coordinating Ministry for the road sector, the MoRTH has recently taken the initiative of Skill Development/upgradation of workmen in the road construction sector for projects with civil works of Rs.100 crore and above. The salient features of the current guidelines are as under:

i) Skill development/upgradation of workmen would be taken up by the concerned Project Head/Executive Engineer through the Authorized Training Centre of Director General of Training (DGT), MSDE, Government of India as per the NSQF.

ii) Training cost would be met out of the provision of contingency fund at a rate of 0.05 percent of the total estimate cost of civil work.

iii) Trainees would be paid stipend up to a maximum limit of Rs.15,000/- per person on the basis of minimum wages to compensate for loss of income during the training period.

iv) The Authority (MoRTH, NHAI, NHIDCL, State PWD) will nominate its Nodal Officers (Project Director/Executive Engineer) and furnish the list of sites where training infrastructure is to be set up by the Training Providers.

v) The Project Director/Executive Engineer will be responsible for implementing the training/assessment. The Training Provider (TP) and the Assessing Body (AB) shall be allocated by the DGT.

vi) The TP shall provide the relevant data of the trainees like Name, Qualification, Aadhaar Card, Residential Proof, Bank Account details etc. to the concerned Project Director/Executive Engineer for payment of stipend to the trainees. The letter would ensure that stipend is deposited directly into bank account of trainee.

vii) Transportation facility, if required for the trainees from site to the nearby villages may be provided by the concerned Project Director/Executive Engineer. Charges for transport shall be paid as per the actual with the approval of competent Authority.

viii) The expenditure towards training shall be met against 0.10 per cent of project estimate and shall include:

a) Payable to the Training provider

- Training cost @ Rs.32.50 per hour per worker. This rate will increase by 10% from every financial year (1.04.2018 onwards).
- Tool kits at the rate of Rs.1500/- to be provided to the worker.

b) Payable to the Assessing Body

- Assessment fees at the rate of Rs.1000/- per worker after declaration of result by respective RDAT.

c) Miscellaneous

- Transportation charges for the worker.
- Charges for consultant and data entry operator at the DGT Headquarters

ix) The TP shall provide training infrastructure at site after approval of the concerned Project Director/Executive Engineer.

x) The TP would inform the concerned Regional Directorate of Apprenticeship Training (RDAT) about the site approval.

xi) The TP shall maintain daily attendance biometric system linked with Aadhaar Card of the construction worker which will be required for reimbursement of Training cost.

xii) The TP will submit details of workmen along with daily attendance during the training to the respective RDAT.

xiii) The Authority can recommend new organization for empanelment of TPs and ABs to the DGT for their consideration and approval.

xiv) Assessment will be done by the ABs empaneled by the DGT, MSDE and it would be as per NCVT Norms.

xv) ABs will submit details of assessments to respective RDAT for issuance of NCVT certificate which is recognized for employment. Competencies would also be inscribed on the certificate.

xvi) The names along with relevant particulars for the certified will be uploaded on the web portal of the MoRTH and the MSDE.

The Contract documents and agreements would be amended as per the following provisions:

i) The Contractor/Concessionaire will try to hire at least 10% trained workmen as per NSQF. If necessary, the requisite workmen may be got trained through recognized institutes.

ii) The Contractor/Concessionaire will organize training at project site for the trainees as and when required as per the training schedule finalized in consultation with training institutes and the Project Director/Executive Engineer.

For ongoing projects supplementary agreements may be signed duly incorporating the above provisions.

10.1.3 Gradually the financial limit for project costs should be lowered to encompass entire road sector. Once the advantages of deploying trained and certified workers are seen and facilities for training developed, even the construction industry would welcome this step and not consider it as a burden. It is to be realized that participation by road contractors would happen only when the Employer starts enforcing the contract provisions relating to engagement of trained personnel on works.

10.1.4 For Rural Roads and smaller contracts, training center needs to be established at least at the District level. Facilities available with ITI's and other training centers established at the State level should be availed of wherever feasible. CSDCI/IESC/DGT have a list of various agencies working for skill development. The Institution of Engineers has decided to provide training to trainers as well as conduct trade test and provide certification to successful candidates. At present this facility is available at Hyderabad, but such facilities can be and need to be extended to other places. The senior management in the Employer's (contractors) organizations need to appreciate and recognize the necessity and importance of deployment of trained and certified workmen through short term training.

10.2 Planning for Training Centre

10.2.1 Training Agency/Organization can consider starting workmen training centers at those places where major construction projects are in progress or likely to be started shortly. These projects can be in public sector or private sector. The administrative authority of the project should be willing to deploy Training Agency for training of workmen employed at project site, with or without financial commitment. The Contractor, Sub-contractor and others should also be desirous for giving co-operation to facilitate the training activity. Before starting training, it will be desirable to create an informal positive attitude towards training of workers and their certification. It is felt that workmen shall be willing to get trained, so long as wages during training are not affected. It is expected that they will be happy to get trained. Positive environment has to be created for training, before starting the actual training.

10.2.2 The Contractor having a construction project in progress can propose establishing the workmen training centre. The centre has to run under the control of a Training Coordinator Committee to be formed at that place, consisting of a Training Coordinator to be nominated by Principal Employer and Nodal Officer to be deployed by Contractor. Other members can be nominated as required. It will be preferable to have a Nodal Officer with Degree or Diploma in Civil Engineering having field experience. The contractor shall submit the proposal for Training Centre at his place with recommendations for names of Nodal Officer and Members after taking their consent. The details about projects and number of workmen likely to be trained should also be given.

10.3 Starting Training Centre

10.3.1 The Training Centre must have faculty of trainers. Trainers will have to be recruited on full time or part time basis and will be certified as trainer by CSDCI / IESC. To start with, for

each trade, at least one trainer is required. The trainer should have adequate knowledge of trade, preferably both in practice and theory. He should be able to demonstrate the work of his trade, either himself or through a workman and should have an aptitude to train. Trainers can be selected from different walks of life which include qualified and/or experienced supervisors, experienced workmen, artisans, instructor of ITI etc. The trainer should be willing to impart training on the basis of his experience and knowledge. These trainers may be required to go to designated Training Centre where training of trainers will be organized by CSDCI / IESC.

10.3.2 The expenditure for training centre will include wages of Secretary, Trainers, Assistants, T&P, furniture, materials, stationery, etc. Depending on projection of activity, the budgetary requirements should be worked out for financial year and sources for funding should be identified. These include (i) administrative department Incharge of the project, (ii) Contractor, (iii) Labour Department of the State Government or its wing which collects Workmen Welfare Cess. Alternatively, some prominent member of Industry or any other donor can finance the training. The budgeting can be done for each project separately.

10.4 Trades and Syllabus

10.4.1 CSDCI / DGE&T, NSDC, Ministry of Skill Development & Entrepreneurship, Govt. of India has published Course Curricula for Short Term Courses in Construction Sector. Specific course curricula will be required to be developed through expert agencies for trades not covered by CSDCI / DGE&T. For all the trades included for training, details of terminal competency, optional terminal competency, practical competencies and underpinning knowledge (Theory), as provided in CSDCI / DGE&T/NSDC documents or developed documents will have to be compiled in advance. Once certification is given to workmen for these basic trades of level I, initiative can be taken to start level II courses which may include, for example, Masonry, System Shuttering Carpenters, Conventional Shuttering Carpenters, Scaffolder, Bar-Bender, Rigger, Welder, Batch plant operator and Electricians of higher competence.

10.4.2 The entry qualification is pre-decided for all the trades. If the trainee workman does not have required qualification, he has also to be given adequate educational input equivalent to required level as prescribed. Besides, duration of training as given in CSDCI/DGE&T/NSDC documents is for a fresh entrant to the trade. The training courses should be designed for imparting training to workmen already in the profession, so duration of training course can be suitably reduced on the basis of initial competency level of trainees.

10.5 Preparations for Training at Project Site

10.5.1 The Employer should nominate its site representative for coordinating training activity. Preferably an Assistant Engineer or equivalent officer, who is available at the project site should be nominee of the Employer. Similarly, the Contractor, Sub-Contractor etc. should also nominate their representatives. Before starting training work, it is necessary that a meeting is arranged at project site where senior representatives should be requested to join. This includes trainers, Employer's engineers connected with the project, Contractor's Project Manager and other managers, representatives of Sub-Contractors and other concerned with the project. This formal meeting should be conducted as per pre-arranged programme. The trainers should be

familiarized for work to be undertaken and others have to give their views. Anticipated difficulties can be discussed and sorted out. Facilities and infrastructure required for training, which includes a class room, laboratory, say 30 Sqm. area each for a batch of 30 trainees, furniture and other necessities, to be provided by Employer/Contractor should be spelled out and decided in the meeting. The broad concept should be given in the meeting that as far as possible, workers are not to be disturbed from their normal job except during practical demonstration in working hours. Besides, beyond normal working hours, trainees will have to spend one hour with trainers, for theory classes. Moreover, depending on specific requirement, it might be necessary to send workers for training outside the project site. The purpose of bringing out various issues in this introductory meeting is to ensure that all concerned give full cooperation for success of training. It has to be management of training by participation. Minutes of introductory meeting should be drawn and circulated and all concerned should cooperate in the training activity according to decisions taken during the meeting.

10.5.2 Employer/Contractor should intimate the total number of workmen in each category separately, as available at project site. Out of these workmen under each category, only 15 to 20 should be considered for preliminary tests and not more than 10, under each trade should be trained in each batch. Second batch can be taken after the training of first batch is completed. Total period for training should be predetermined as per trade/QP & level of QPs.

10.5.3 Thereafter, the Employer/Contractor should forward the list of workmen under different categories, to be considered for training, in the first batch. For each workman, the application form with photograph, should be filled up and kept on record. The needful should be done by a pre-decided date, so that training proceeds as per Schedule. In case total number of trainees in some category is likely to be less than 10, it will be desirable to get some workmen from nearby project sites, if possible.

10.6 Entrance Test of Trainees and Gap Analysis

10.6.1 Once list of trainees with application forms is forwarded to Training Agency, by Project Authorities, an introductory meeting should be arranged by Secretary, Management Committee, at project site, where trainees and trainers can be introduced to one another. A feeling of active participation for training should be got generated in the trainees.

10.6.2 The purpose of entrance test of trainees is to ascertain individually, the skill, knowledge of profession and education level, already available with the trainee. Since required skills are decided by standards laid down by CSDCI / NSDC / DGE&T for most of the categories, the gap between the desired and, as available with the trainee, has to be ascertained. This entrance test is to be taken by at least two trainers (one being for the trade concerned). Depending on situation, it can be verbal and practical. Normally it should be possible to judge the competence level of an individual in one hour time.

10.6.3 A workmen should have knowledge, required skill and educational qualification as prescribed for his trade/QP. Besides, the workmen are expected to have the knowledge of other trades having interface with his trade. Moreover, safety requirements should also be known to the workmen. For guidance of trainers, on the basis of experience gained in entrance test at

project sites, suggested lists of questions to be asked should be prepared for different trades in advance. These will be helpful to trainers to give entrance tests. As trainers gain experience, they will be able to decide ways and means to examine trainees during entrance test.

10.6.4 After assessment/entrance test, for each workman, a report has to be prepared indicating his level of competence. Thereafter, a comprehensive report for each trade has to be prepared, indicating level of competencies of different workmen and selecting trainees for each trade. Others who cannot be selected should be informed about their proficiency level and guidance given for improvement by highlighting weakness/shortcomings. These workmen can be asked to improve and Employer be informed to help them. They can be considered in next batch. The report should be submitted to Chairman Management Committee for acceptance by the Committee, and returned with observations, if any, to Secretary/Training Coordinator for undertaking training.

10.7 Organizing Training

10.7.1 On the basis of Gap Analysis and review of knowledge of proficiency level of each trainee, it is possible to work out, separately for each trade, the competence of trainees. Trainers should prepare separate report for their trades and submit proposals for the training indicating the demonstrations required for practical work and input of theory, to raise the level of trainees to the Standards of CSDCI / DGE&T Syllabus. These reports for all the trades should be discussed between Secretary and trainers. After discussions, reports should be modified on a common plan for working. The details of identified trainees should be divided in batches and their details including Aadhaar number and bank account be uploaded on Skill Development Management System (SDMS) under NSDC, Ministry of Skill Development & Entrepreneurship, Govt of India.

10.7.2 Each trainer should prepare detailed breakup of practical work and theory, in number of sessions. The experience gained on training at the projects has indicated that about ten practical demonstration sessions and about thirty theory classes should normally cover the total input required by trainees. However, it is left to the trainers to decide the time to be allotted for practical demonstration, training and theory.

10.7.3 Practical demonstration will have to be organized during working hours. For each session, theory to be taught and practical demonstrations to be given should be pre-decided and pre-conceived leaving nothing to chance. Materials, equipment, tools and any other aid should be arranged beforehand. Effort should be made to arrange the demonstration at a place where the work is in progress. Session should cover knowledge about materials, tools, techniques etc. It should be interactive session, giving opportunity to trainees to participate. After demonstration session, questionnaire should be given to trainees to fill their replies in Yes/No format. This should be taken back immediately thereafter and kept in record individually for each trainee.

10.7.4 If necessary, for highly skilled job, demonstration can be organized outside project site. Specific training for a job can also be arranged at existing training centres.

10.7.5 Trainees normally remain engaged in their allotted work by Contractor. The trainer has to inspect the work of each trainee, every working day and spend time with him/her giving suggestions for improvements. Trainer has to keep record of each trainee and trainee has to

keep record of work done by him/her on each day indicating improvements suggested and the manner in which these were implemented. The training centre has to issue work notebook to each trainee to record details of his/her work and input received from trainer.

10.7.6 Theory classes are to be organized after normal working hours. Theory classes should generally cover common subjects for all the disciplines such as knowledge of language (reading and writing), arithmetic, reading of drawings, safety requirements, health requirements, coordination requirements etc. Common lectures should be planned for each trade separately. For all lectures, a questionnaire should be given at end of lecture and got filled from the trainees, immediately at the close of lecture session.

10.7.7 The details of training imparted should be reviewed and discussed by trainers. In case any shortcoming is noticed, additional demonstration class or theory class should be arranged.

10.7.8 After completion of training, an Internal trade test should be arranged, similar to the test being conducted by approved certification agencies. After trainees are declared successful in internal trade test, they are ready for trade test by approved agency of CSDCI.

10.8 Assessment and Certification

10.8.1 CSDCI, NSDC, Ministry of Skill Development & Entrepreneurship, Govt. of India has affiliated and circulated a list of approved and affiliated agencies. Assessment will be carried out by CSDCI through certified assessors of these affiliated agencies. After assessing the skill/ capabilities of workmen (trainee), they will publish results through Skill Development Management System (SDMS) under NSDC and issue certificates. CSDCI should be approached giving information about batch, details of trainees, date of assessment to be carried out and necessary fees deposited in advance. They will carry out assessment at their centre and workmen should be taken to that centre as per pre-decided programme. After the certificate is issued by the agency, it should be given to the workmen.

CHAPTER 11

TRAINING OF TECHNICIANS

11.1 Training is to be imparted for several other categories such as Laboratory Technician, Supervisors, Surveyors, Equipment Operators etc. In order to develop broad concept of training in these categories, one example of Laboratory Technicians has been given here. The purpose is to train and certify Laboratory Technicians for testing of concrete from mixing to placement to maturity. Various steps involved in this process and the required tests as per BIS, IRC:112 and MoRTH Specifications are to be identified. The testing procedure, acceptance criteria, which includes sampling at source/batching plant/ cement godown, testing at site laboratory and site itself are to be identified and listed. The complete testing procedure including formats used during the testing of samples is to be compiled for distribution to the participants. These persons in the training programme should include technicians working in the laboratory, contract workers deployed at site including Engineer at junior level, work assistants working with the concrete, workers at RMC plant and those deployed at batching plant at site/casting yards etc. Group of 15-20 participants should be formed for one batch. They should be imparted training in class room as well as laboratory.

11.2 Suitable class room equipped with Projector, Screen, Board with marker plus etc. should be selected for class room training. Before the start of the training course, one copy of the Study Material should be distributed to all the participants. After the class room training on a particular subject, the candidates should be sent to site laboratory, to get demonstration of the testing as per relevant course, by the experienced lab in charge. Immediately after the field training, the candidates should be asked to test the concrete themselves so that any problem faced can be identified and solved at that time in such a manner that candidates become familiar with the testing procedure studied in the class room and in the laboratory. The relevant extracts of BIS codes should be included in the course so that they will not find any doubt. In case of any doubt, relevant BIS code can be referred. For recording the readings, proper formats should be developed along with the calculation sheets, wherever required, on the required format itself. The acceptance criteria should also be included in the format to ensure that the testing is done correctly as per the prescribed procedure.

11.3 The laboratory should be either National Accreditation Board for Testing and Calibration Laboratories(NABL) accredited one or having such required facilities. Sometimes, it is required to select site laboratory so that the candidates can get a feel of testing the live samples directly received from the field or specimens prepared by the participants from the concrete being used actually in the field.

11.4 Two types of faculty members i.e. Trainers are required. One to conduct class room training and the other to conduct field training. Trainers of class room training should be those who are associated in the field like Assistant Engineers and Executive Engineers. The idea behind selection of such personnel is that they can share field experience in a better manner than the faculty of some teaching institutions. Faculty of Technical Institutions are suitable for giving the technical background. The persons demonstrating the test in the laboratory are those who are getting in-depth knowledge in the area of testing procedure as prescribed in the relevant course.

One of the important subjects identified is Quality Assurance, to sensitize the lab technicians about this important aspect of Engineering.

11.5 For certification of trainees, it is necessary to conduct examination through certified Assessors of affiliated Assessment Agencies of CSDCI. Trainees should be given question paper to test the knowledge acquired. Besides, there should be practical examination in laboratory, followed by viva examination as per guidelines of CSDCI/NSDC. Trainees should be declared pass only when they score marks as specified in the Qualification Pack/Trade Book.

CHAPTER 12

TRAINING OF TRAINERS

12.1 In the preceding chapters, emphasis has been made on the training, assessment and certification of workers. For this, it is necessary to ensure that suitable facilities for training them are available. The facilities include:

a) Physical Infrastructure like training institute, class rooms, laboratories/project site for practical training.

b) Designing the curriculum suitable for each category of workers along with making the literature and study material available in soft as well as hard format.

c) Trained and certified trainers for providing training and basic knowledge and skill for relevant Qualification Pack/Job roles to the workers as good industry practice.

12.2 The training of trainers should be carried out at selected training centre which are better equipped and have lead trainers to provide the training to trainers. These training centres can be called as ToT centres or Skill Academies and will have boarding and lodging facilities. Training for Trainers / Lead Trainers are provided by Lead Trainer at ToT Centres (Skill Academies).

12.3 Training of Trainers (ToT) course be designed based on relevant Qualification Pack/ Job roles as per ToT guidelines of NSDC. The curriculum and syllabus shall be as defined in the respective Qualification Pack (QP) and shall adequately cover the complete domain of the QP and platform skill for both Trainer and Lead Trainer. Operating Manual of the construction machineries and equipment is good source to define the syllabus for each kind of machine and should be taken into account while preparing the syllabus. It will be ensured that training of trainer be carried out by trained and certified Lead Trainer only.

12.4 Trainers and Lead trainers should be selected as per pre-requisites of qualification and experience for the NSQF level and specific QP as fixed by SSC. The trainer should have adequate experience and knowledge about the equipment operation. The minimum experience and qualification required for trainer and lead trainer as given by CSDCI / NSDC will be ensured. Experts of equipment manufacturers be invited to act as Guest Faculty. Success of any training programme lies in the quality of training imparted which is possible only from the competent and experienced trainers available to impart training to the workers in the class room. The trainers should also keep themselves well versed with the advancement in the technologies in field. The training will be provided both on domain of the QP as well as platform skill. After all, they hold the key to fulfilling the mission of skill development of workmen and achieving the mission of deploying skilled and certified workmen on the job.

12.5 After completion of training, assessment will be carried out by a Lead Assessor/ Assessor certified by CSDCI / SSC. The assessment will include both formative and summative. Formative assessment will be carried out by the Lead Trainer during the training period.

Summative assessment will be carried out in two parts i.e. Domain Skill Test & Platform Skill Test. The Trainers and Lead Trainers will be declared qualified once they score more than 80% (for Trainer) & 90% (for Lead Trainer) marks at domain and platform skill separately. On successful completion, a certificate will be issued to that effect.

CHAPTER 13

WAY AHEAD

13.1 Road Sector though serves the purpose of a common man, but it is a specialized sector, if we look into specialized aspects like alignment, geometrics and other important structures like flyovers, underpasses, bridges, tunnels, interchanges etc. A well designed and well-constructed road can serve the purpose very well, but a poorly designed and poorly constructed road can spoil the project without achieving desired results. Annual expenditure in road sector is going to be in the range of Rs. 160,000 to 200,000 crore per annum. With such huge investments at stake, it is essential that the project should not only be of good quality but also it should be well designed and meaningful to the society with due attention paid to the environmental and social site ground issues. In other words, the aim is to have sustainable development in road sector and in order to achieve this aim, it is essential that the work force deployed at ground level should be skilled. At times, the project is designed by the best consultants and even assigned to the best construction agency at the best rates, but the outcome may not be the best, if the competent and skilled work force is not deployed at the construction site. Skilled workmen should be deployed on the job for obtaining the desired results in the best interest of the society.

13.2 Another issue which comes out is the availability of skilled workmen for which it is essential that quality training institutes should be made available at adequate number of places spread across length and breadth of the country considering its vast area. Further, along with quality training institutes, it is essential that the trainers should also be well experienced, well qualified and have an inclination to impart training to the workmen in a professional manner. Hence, in order to achieve the objective, training of the trainers is also equally important as that of the training of the workmen.

13.3 It is necessary that the client departments act as facilitators and provide the necessary information. They should also encourage industry partners to develop linkage with Sector Skill Councils to obtain part of the funds required for the training.

13.4 As the prime coordinating Ministry, the MoRTH has taken the lead that, for all contracts of value more than Rs. 100 Crore there is a provision for deployment of trained and certified workmen in the designated categories. Gradually, this financial limit may be lowered to encompass the entire road sector.

13.5 There is another line of thought to ensure that required action/decision gets implemented. Why mention the requirement (like in FIDIC – “The Contractor’s personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations.”), when it is to be implemented in an environment, for example, where traffic police is also required along with the traffic light. This line of thought suggests that the Contract provisions should be sufficiently detailed to include specific mention of categories, level of training and syllabus, acceptable training and certifying organization/institutions, how the wages and cost of training to be met and the penalty for default. Also, it is not a onetime affair. Required categories of trained persons in required number are to be available throughout the duration of the Contract. That is to say that the Employer, while preparing the bid document, should also do his home work in working out such details for inclusion. Gradually, the requirement in bid documents should shift

from training most of the workmen at site to employing mostly already trained workmen. A good example of detailed Contract provision of a specific requirement of the Employer is regarding Safety, Health and Environment (SHE) in Delhi Metro Rail Corporation Bidding Document.

13.6 It is also necessary to consider health and hygiene at worksites, safety concept at work sites and at labour camps. Current labour laws and regulations provide for this. More than one trade workers for completing a part of the job, e.g. carpenter, bar bender, mason, vibrator operator etc. for RCC work are required. Therefore, group is to be trained jointly as most of the workers are uneducated, develop syllabus on topics other than work to impart some basic knowledge regarding language (regional or national +Hindi or English) sufficient to read and write, basic arithmetic, basic understanding of the subject and understanding of instructions, Yoga classes, Ethics or Neeti Shastra different for different standards of education like for persons educated - up to class V, VIII or X, living conditions, health, basic hygiene could be part of ethics syllabus for overall improvement of wellbeing of workers.

Annexure 1

LIST OF MES COURSES APPROVED BY NCVT – CONSTRUCTION AND OTHER TRADES RELATED TO HIGHWAYS

Six digit code is used for each MES course as per details given below:

From left side:

1st, 2nd and 3rd letters – Sector Code (Alpha Codes)

4th digit – Level Code (1 for level 1, 2 for level 2, 3 for level 3 and so on)

5th and 6th digits – Course Serial Number (separate series for Courses at same level within each Sector)

For Example CON 101

CON: Construction

1: Level One Course

01: Course Serial Number (Assistant Shuttering Carpenter and Scaffolder)

A. Construction					
S. No.	**MES Course Code**	**Sector/Course**	**Minimum Education Qualification & MES Course**	**Duration of Training (Hours)**	**Test Fee (Rs)**
CON	**CONSTRUCTION**		**Minimum age-14 years**		
1.	CON 101	Assistant Shuttering Carpenter & Scaffolder	5th	300	800/-
2.	CON 202	System Shuttering Carpenter	5th + CON 101	300	800/-
3.	CON 203	Conventional Shuttering Carpenter	5th + CON 101	300	800/-
4.	CON 204	Scaffolder	5th + CON 101	300	800/-
5.	CON 205	Building Carpenter	5th + CON 101	300	800/-
6.	CON 106	Assistant Bar Bender & Steel Fixer	5th	300	800/-
7.	CON 207	Bar Bender	5th + CON 106	300	800/-
8.	CON 108	Assistant Mason	5th	300	800/-
9.	CON 209	Mason	5th + CON 108	300	800/-
10.	CON 210	Tiler (Ceramic)	5th + CON 108	300	800/-
11.	CON 111	Assistant Plumber	5th	300	800/-
12.	CON 212	Plumber	5th + CON 111	300	800/-
13.	CON 113	Assistant Works Supervisor	8th	300	800/-
14.	CON 114	Assistant Storekeeper	12th	200	800/-
15.	CON 115	Junior Land Surveyor	10th	400	800/-
16.	CON 216	Works Supervisor	10th + CON 113	300	800/-
17.	CON 217	Storekeeper	Graduate Degree in any discipline + CON 114	300	800/-
18.	CON 218	Senior Land Surveyor	10th + CON115	400	800/-

A. Construction					
S. No.	**MES Course Code**	**Sector/Course**	**Minimum Education Qualification & MES Course**	**Duration of Training (Hours)**	**Test Fee (Rs)**
19.	CON 119	Junior Rural Road Layer	5th	120	800/-
20.	CON 120	Assistant Highway Works Supervisor	Inter Pass, ITI, GWS, III Year Diploma appeared	300	800/-
21.	CON 221	Highway Works Supervisors	Inter Pass, ITI, GWS, III Year Diploma appeared+ CON 120	300	800/-
22.	CON 222	3D Designer Using Pro E	10th +ICT 101	200	800/-
23.	CON 323	3D Advanced Design Using Pro E	10th +CON 222	200	800/-
24.	CON 124	Construction Electrician-I	8th	300	800/-
25.	CON 225	Construction Electrician-II	8th + CON 124	150	800/-
26.	CON 326	Construction Electrician-III	8th +CON 225	300	800/-
27.	CON 227	Building Security System Mechanic	8th + ELC 101+ ICT 101	200	800/-
28.	CON 128	Rigger	Basic Reading & Writing	200	800/-
29.	CON 229	Electrical Wireman	8th + ELE 101	200	800/-
30.	CON 230	Control Panel Assembler	8th + ELE 101 + FAB 109	200	800/-
31.	CON 231	Electrical Fitter	8th + ELE 101	200	800/-
32.	CON 232	Overhead Linesman	8th + ELE 101 + CON 111	200	800/-
33.	CON 233	Cable Jointer (Power)	8th + ELE 101 + CON 111	200	800/-
34.	CON 234	Communication System Mechanic	8th + ELE 101+ELC 101	200	800/-
35.	CON 235	Refrigeration/ Air Conditioning/ Ventilation Mechanic (Electrical Control)	8th + ELE 101 + FAB 108	200	800/-
36.	CON 236	Fire Services Electrical Fitter	8th +ELE 101+ ELC 101	200	800/-
37.	CON 437	Construction Electrician-IV	8th +CON 326	200	800/-
38.	CON 138	Helper	5th +Able to Read & Write & 14 years of age	90	500/-
39.	CON 139	Earth Work Excavator	Read & Write Local language	150	500/-
40.	CON 140	Granite Stone Dresser – I	5th	200	500/-

Annexure 2

LIST OF MES COURSES APPROVED BY NCVT –OTHER TRADES RELATED TO HIGHWAYS

Six digit code is used for each MES course as per details given in **Annexure 1**

Other Sector related to Highway Sector

Sl. No.	MES Course Code	Sector/ Course	Minimum Educational Qualification & MES Course	Duration of Training (hours)	Test Fee (Rs)
	BAN	**BANKING & ACCOUNTING**	**Minimum age – 14 years**		
19.	BAN 101	Accounting	12^{th}	450	500/-
	ELE	**Electrical**	**Minimum age – 14 years**		
65.	ELE 101	Basic Electrical Training	5^{th}	120	800/-
67.	ELE 203	House Wiring	8^{th} + ELE 101	120	800/-
	ELC	**ELECTRONICS**	**Minimum age – 14 years**		
74.	ELC 101	Basic Electronics (Repair & Maintenance of Power supply, Inverters and UPS)	8^{th}	120	800/-
	FAB	**FABRICATION**	**Minimum age – 14 years**		
92.	FAB 101	Basic Welding (Gas)	8^{th}	120	800/-
93.	FAB 102	Basic Welding (Arc)	8^{th}	120	800/-
94.	FAB 103	Gas Cutting	8^{th}	120	800/-
95.	FAB 204	TIG Welding	8^{th} + FAB 101	90	800/-
96.	FAB 205	MAG/ CO_2 Welding	8^{th} + FAB 102+103	90	800/-
97.	FAB 206	Fabrication Welding	8^{th} + FAB 102+103	180	800/-
98.	FAB 207	Pipe Welding (TIG & ARC)	8^{th} + FAB 102+103	150	800/-
99.	FAB 108	Basic Fitting Work	8^{th}	180	800/-
100.	FAB 109	Basic Sheet Metal Work	8^{th}	180	800/-
101.	FAB 210	Structural Fabrication	8^{th} + FAB 103	150	800/-
102.	FAB 211	Pipe Fabrication	8^{th} + FAB 103	150	800/-
	ICT	**INFORMATION AND COMMUNICATION TECHNOLOGY**	**Minimum age – 14 years**		
324.	ICT 101	Computer Fundamentals, MS-Office & Internet	8^{th}	120	800/-
325.	ICT 102	Tally	10^{th}	180	800/-
326.	ICT 203	Desk Top Publishing	8^{th} + ICT 101	150	800/-
	PAI	**PAINT**	**Minimum age – 14 years**		
490.	PAI 101	Painter Assistant / helper	5^{th}	90	800/-

Sl. No.	MES Course Code	Sector/ Course	Minimum Educational Qualification & MES Course	Duration of Training (hours)	Test Fee (Rs)
491.	PAI 202	Wall Painter	5th + PAI 101	120	800/-
493.	PAI 204	Metal Surface Painter	5th + PAI 101	150	800/-
494.	PAI 205	Spray Painter	5th + PAI 101	90	800/-
495.	PAI 306	Painter (Application, Testing, Handling and Storing)	5th + Any one of MES Level II Course	120	800/-
	SEC	**SECURITY**	**Minimum age – 16 years**		
541.	SEC 104	Security Guard (General)	8th	150	500/-
	FRS	**FIRE AND SAFETY ENGINEERING**	**Minimum age – 18 years**		
668.	FRS 101	Assistant Fire Operator	10th	300	800/-
669.	FRS 202	Fire and Rescue Operator	10th + FRS 101	300	800/-
	MAM	**MATERIAL MANAGEMENT**	**Minimum age – 18 years**		
678.	MAM 101	Store Attendant	8th	180	800/-
679.	MAM 102	Material handling	8th	160	800/-
680.	MAM 103	Finish Goods Keeper	10th	160	800/-
681.	MAM 104	Assistant Storekeeper	12th	300	800/-
682.	MAM 205	Storekeeper	12th + MAM 104	300	800/-
	RWH	**RAIN WATER HARVESTING**	**Minimum age – 18 age**		
1157.	RWH 101	Assistant Rain Water Harvester	7th	200	500/-
1158.	RWH 202	Rain Water Harvester	7th + RWH 101	200	500/-

Annexure 3

LIST OF QUALIFICATION PACKS INDICATING NSQF LEVEL, MINIMUM EDUCATION & TRAINING HOURS DEVELOPED BY CONSTRUCTION SKILL DEVELOPMENT COUNCIL OF INDIA (CSDCI)

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
Masonry	1.	CON/Q0101	Helper Mason	L1	Preferably 5th Standard	300
	2.	CON/Q0102	Assistant Mason	L2	Preferably 5th Standard	350
	3.	CON/Q0103	Mason General	L4	Preferably 5th Standard	400
	4.	CON/Q0104	Mason Tiling	L4	Preferably 5th Standard	400
	5.	CON/Q0105	Mason Concrete	L3	Preferably 5th Standard	400
	6.	CON/Q0106	Mason Marble, Granite and Stone	L4	Preferably 8th Standard	600
	7.	CON/Q0107	Mason - Special Finishing	L4	Preferably 8th Standard	600
	8.	CON/Q0108	Mason Form Finished & Special Concrete	L4	Preferably 8th Standard	600
	9.	CON/Q0109	Foreman Wet Finishing and Flooring	L5	Preferably 10th Standard	800
	10.	CON/Q0110	Foreman - Concrete	L5	Preferably 10th Standard	800
	11.	CON/Q0111	Supervisor Structure	L6	Preferably 12th Standard	100
	12.	CON/Q0112	Supervisor Finishes	L6	Preferably 12th Standard	100
Bar Bending and Fixing	13.	CON/Q0201	Helper Bar Bender and Steel Fixer	L1	Preferably 5th Standard	300
	14.	CON/Q0202	Assistant Bar Bender and Steel Fixer	L2	Preferably 5th Standard	350
	15.	CON/Q0203	Bar Bender and Steel Fixer	L4	Preferably 5th Standard	400
	16.	CON/Q0204	Reinforcement Fitter	L4	Preferably 8th Standard	600
	17.	CON/Q0205	Foreman Reinforcement	L5	Preferably 10th Standard	800

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
Shuttering Carpentry	18.	CON/Q0301	Helper Shuttering Carpenter	L1	Preferably 5th Standard	300
	19.	CON/Q0302	Assistant Shuttering Carpenter	L2	Preferably 5th Standard	350
	20.	CON/Q0304	Shuttering Carpenter - System	L4	Preferably 5th Standard	600
	21.	CON/Q0310	Shuttering Carpenter -Conventional	L4	Preferably 8th Standard	400
	22.	CON/Q0306	Chargehand - Shuttering Carpenter -System	L4	Preferably 8th Standard	400
	23.	CON/Q0311	Chargehand - Shuttering Carpenter-Conventional	L4	Preferably 8th Standard	600
	24.	CON/Q0308	Foreman Formwork	L5	Preferably 10th Standard	800
Scaffolding	25.	CON/Q0314	Assistant Scaffolder -System	L2	Preferably 5th Standard	350
	26.	CON/Q0313	Assistant Scaffolder-Conventional	L2	Preferably 5th Standard	350
	27.	CON/Q0312	Scaffolder Conventional	L4	Preferably 5th Standard	400
	28.	CON/Q0305	Scaffolder - System	L4	Preferably 5th Standard	400
	29.	CON/Q0307	Chargehand Scaffolding - System	L4	Preferably 8th Standard	600
	30.	CON/Q0309	Foreman - Scaffolding	L5	Preferably 10th Standard	800
Construction Electrical Works	31.	CON/Q0601	Helper Electrician	L2	Preferably 10th Standard	350
	32.	CON/Q0602	Assistant Electrician	L3	Preferably 10th Standard	600
	33.	CON/Q0603	Construction Electrician - LV	L4	Preferably 10th Standard / Low Voltage license from any Govt. recognized Licensing Authority	600
	34.	CON/Q0604	Foreman - Electrician Works (Construction)	L5	Preferably 10th Standard	800

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
	35.	CON/Q0605	Supervisor - Electrical Works	L6	Preferably 12th Standard and compulsorily having Low Voltage license from any Govt. recognized Licensing Authority	100
Construction Painting	36.	CON/Q0501	Helper Construction Painter	L1	Preferably 5th Standard	300
	37.	CON/Q0502	Assistant Construction Painter & Decorator	L2	Preferably 5th Standard	350
	38.	CON/Q0503	Construction Painter & Decorator	L3	Preferably 5th Standard	400
	39.	CON/Q0504	Chargehand - Painting & Decorating	L4	Preferably 8th Standard	600
	40.	CON/Q0505	Foreman - Painting & Decorating	L5	Preferably 10th Standard	800
Quality Assurance and Quality Control	41.	CON/Q0401	Helper - Construction Laboratory and Field Technician	L2	Preferably 8th Standard	300
	42.	CON/Q0402	Construction Laboratory & Field Technician	L4	Preferably 10th Standard	400
	43.	CON/Q0403	Quality Technician	L6	Preferably 12th Standard	100
	44.	CON/Q0404	Construction UT Tester	L3	Preferably 10th Standard	400
	45.	CON/Q0405	Construction MPT Tester	L3	Preferably 10th Standard	400
	46.	CON/Q0406	Construction DPT Tester	L3	Preferably 10th Standard	400
	47.	CON/Q0407	Assistant Paint Inspector	L5	Preferably 10th Standard	800
Rigging	48.	CON/Q0701	Khalasi (Assistant Rigger)	L2	Preferably 5th Standard	350
	49.	CON/Q0702	Rigger - Structural Erection	L3	Preferably 5th Standard	400
	50.	CON/Q0703	Rigger - Precast Erection	L3	Preferably 5th Standard	400
	51.	CON/Q0704	Rigger - Piling	L4	Preferably 5th Standard	400
	52.	CON/Q0705	Chargehand - Structural Erection	L4	Preferably 5th Standard	600

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
	53.	CON/Q0706	Chargehand - Precast Erection	L4	Preferably 10th Standard	600
	54.	CON/Q0707	Chargehand - Piling	L4	Preferably 8th Standard	600
	55.	CON/Q0708	Foreman - Erection	L5	Preferably 10th Standard	800
	56.	CON/Q0709	Supervisor - Erection	L6	Preferably 12th Standard	100
	57.	CON/Q0710	Supervisor - Piling	L6	Preferably 12th Standard	100
Fabrication	58.	CON/Q1201	Helper Fabrication	L1	Preferably 5th Standard	300
	59.	CON/Q1202	Assistant Construction Fitter	L2	Preferably 10th Standard	350
	60.	CON/Q1203	Grinder- Construction	L2	Preferably 10th Standard	350
	61.	CON/Q1204	Gas Cutter-Construction	L2	Preferably 8th Standard	350
	62.	CON/Q1205	Construction Fitter	L3	Preferably 10th Standard	400
	63.	CON/Q1251	Tack Welder	L3	Preferably 10th Standard	400
	64.	CON/Q1252	Construction Welder MIG – L4	L4	Preferably 10th Standard	600
	65.	CON/Q1253	Construction Welder TIG - L4	L4	Preferably 10th Standard	600
	66.	CON/Q1254	Construction Welder SMAW - L4	L4	Preferably 10th Standard	600
	67.	CON/Q1207	Plasma Cutter	L4	Preferably 10th Standard	600
	68.	CON/Q1206	Fabricator	L4	Preferably 12th Standard	600
	69.	CON/Q1208	Foreman Fabrication	L5	Preferably 12th Standard	800
	70.	CON/Q1255	Senior Construction Welder MIG – L5	L5	Preferably 10th Standard	800
	71.	CON/Q1256	Senior Construction Welder TIG – L5	L5	Preferably 10th Standard	800
	72.	CON/Q1257	Senior Construction Welder SMAW – L5	L5	Preferably 10th Standard	800

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
	73.	CON/Q1209	Supervisor Fabrication	L6	Preferably Diploma in Civil / Mechanical	100
	74.	CON/Q1210	Multi Skill Technician - Fabrication	L3	Preferably 5th Standard	400
Pre-stressing	75.	CON/Q0801	Assistant Technician - Prestress	L2	Preferably 8th Standard	350
	76.	CON/Q0802	Technician - Prestress	L4	Preferably 8th Standard	600
	77.	CON/Q0803	Senior Technician - Prestress	L6	Preferably 12th Standard	100
Surveying	78.	CON/Q0901	Assistant Surveyor	L2	Preferably 5th Standard	350
	79.	CON/Q0902	Surveyor	L6	ITI/ Diploma in Civil / Land Surveying	100
Roads & Runway Construction	80.	CON/Q1001	Assistant Pavement Layer	L2	Preferably 5th Standard	350
	81.	CON/Q1002	Pavement Layer	L4	Preferably 8th Standard	400
	82.	CON/Q1003	Foreman - Roads & Runways	L5	Preferably 12th Standard	800
	83.	CON/Q1004	Supervisor - Roads & Runways	L6	Preferably Graduate/ITI (Construction related trade)	100
Interior & Exterior Finishes	84.	CON/Q1101	Helper Interior Finishes	L1	Preferably 5th Standard	300
	85.	CON/Q1102	Helper Façade Installer	L1	Preferably 5th Standard	300
	86.	CON/Q1103	Assistant False Ceiling and Drywall Installer	L2	Preferably 5th Standard	350
	87.	CON/Q1104	Assistant Façade Installer	L2	Preferably 5th Standard	350
	88.	CON/Q1105	Doors & Windows Fixer	L3	Preferably 5th Standard	400
	89.	CON/Q1106	Façade Installer	L3	Preferably 5th Standard	400
	90.	CON/Q1107	False Ceiling & Dry Wall Installer	L3	Preferably 5th Standard	400
	91.	CON/Q1108	Chargehand - Façade Installer	L4	Preferably 8th Standard	600

Occupation	S. No.	QP Code	Job role	NSQF Level	Minimum Qualification	Total Hours of Training Required
	92.	CON/Q1109	Chargehand - False Ceiling & Drywall Installer	L4	Preferably 8th Standard	600
	93.	CON/Q1110	Foreman - Facade Installation	L5	Preferably 10th Standard	800
	94.	CON/Q1111	Foreman - False Ceiling and Dry wall Installer	L5	Preferably 10th Standard	800
Draughting	95.	CON/Q1301	Draughtsman	L4	ITI/Diploma Civil	600
EHS	96.	CON/Q1401	EHS Steward	L4	Preferably 12th Standard and compulsory Certification Course in Industrial Safety	600
	97.	CON/Q1402	Supervisor - Site EHS	L6	Preferably 12th Standard and compulsory Certification Course in Industrial Safety	100
Store Keeping	98.	CON/Q1501	Store Assistant -Construction	L2	Preferably 10th Standard	400
	99.	CON/Q1502	Junior Store Keeper -Construction	L5	Preferably 10th Standard	800
	100.	CON/Q1503	Store Keeper -Construction	L6	Preferably Graduate	100
Masonry-Rural	101.	CON/Q3603	Rural Mason	L4	Preferably 5th Standard	400

Annexure 4

LIST OF QUALIFICATION PACKS INDICATING QP CODE AND NSQF LEVEL DEVELOPED BY INFRASTRUCTURE EQUIPMENT SECTOR COUNCIL (IESC)

S. No.	QP Code	Job Roles	NSQF Level
		OPERATORS	
1.	IES/Q0101	Backhoe Loader Operator	4
2.	IES/Q0102	Junior Backhoe Operator	3
3.	IES/Q0103	Excavator Operator	4
4.	IES/Q0104	Junior Excavator Operator	3
5.	IES/Q0105	Wheel Loader Operator	4
6.	IES/Q0106	Compactor Operator	4
7.	IES/Q0107	Concrete Pump Operator	4
8.	IES/Q0108	Hydra Crane Operator	4
9.	IES/Q0109	Tyre Mounted Crane Operator	4
10.	IES/Q0110	Crawler Crane Operator	4
11.	IES/Q0111	Junior Operator Crane	3
12.	IES/Q0112	Crusher Operator	4
13.	IES/Q0113	Junior Crusher Operator	3
14.	IES/Q0114	Hot Mix Plant Operator	4
15.	IES/Q0115	Junior Hot Mix Plant Operator	3
16.	IES/Q0116	Batching Plant Operator	4
17.	IES/Q0117	Junior Batching Plant Operator	3
18.	IES/Q0118	Transit Mixer Operator	4
19.	IES/Q0119	Junior Transit Mixer Operator	3
20.	IES/Q0120	Paver Operator	4
21.	IES/Q0121	Junior Paver Operator / Screedman	3
22.	MIN/Q0205	Bulldozer Operator	4
23.	MIN/Q0415	Compressor Operator	4
24.	MIN/Q0430	Grader Operator	4
25.	ISC/Q0403	Dumper Operator	4
		MECHANICS	
26.	IES/Q1101	Mechanic (Engine)	4
27.	IES/Q1102	Junior Mechanic (Engine)	3
28.	IES/Q1103	Mechanic (Hydraulic)	4
29.	IES/Q1104	Junior Mechanic (Hydraulic)	3
30.	IES/Q1105	Mechanic(Electrical/Electronics/Instrumentation)	4
31.	IES/Q1106	Junior Mechanic (Electrical/Electronics/Instrumentation)	3
		SUPERVISOR	
32.	IES/Q1201	Supervisor Maintenance (Infrastructure Equipment)	7
33.	IES/Q0201	Supervisor (Plant & Machinery)	7

Annexure 5

CONSOLIDATED LIST OF TASKS FOR TRAINING OF SUPERVISORS/FOREMEN OF DIFFERENT CATEGORIES

Activity Area		Category		
I	**CONSTRUCTION**			
		i)	Steel Structure Fabrication & Erection	
		ii)	Pre-stressing	
		iii)	Bar Bending/Fixing	CON 106, CON 207
		iv)	Scaffolding	CON 204
		v)	Shuttering	CON 101, CON 202, CON 203
		vi)	R C Structure Works	
		vii)	Masonry	CON 209
		viii)	Ready Mix Concrete	
		ix)	Bituminous Works	
		x)	Cross Drainage	
		xi)	Drilling/Blasting/Rock Cutting	
		xii)	Road Works Flexible Pavement	
		xiii)	Road Works Rigid Pavement	
		xiv)	Sub-surface Drainage	
		xv)	River Training & Protection Works	
		xvi)	Gabion Structures	
		xvii)	Geo-synthetic & Reinforced Earth	
		xviii)	Soil Stabilisation	
		xix)	Pneumatic Sinking	
		xx)	Crash, Safety Barriers, Signage	
		xxi)	Preservation of Good Earth, Slope Protection-Turfing	
II	**SURVEY**			
		i)	Surveyor	CON 218
		ii)	Survey Data Entry Operator	
		iii)	Survey Assistant	
III	**TESTING LABORATORY**			
		i)	Lab Incharge	
		ii)	Lab Assistant	
		iii)	Geo Technical	
		iv)	Sensitivity Equipment Operator	
		v)	Nuclear Density Gauge Operator	
IV	**MECHANICAL**			
		i)	Hot Mix Plant Supervisor	
		ii)	Concrete Batching Plant Supervisor	

Activity Area		Category		
		iii)	Heavy Equipments, Repair/Overhaul*	
		iv)	Diesel Engine	
		v)	Heavy Vehicles	
		vi)	Auto Electric/Electronic System	
		vii)	Crane Supervisors	
		viii)	Machinery Repair/Workshop Supervisor	
		ix)	Stone Crusher Foreman	
		x)	Prestressing Foreman	
		xi)	Well Sinking Supervisor	
		xii)	WMM Plant Supervisor	
V	**ELECTRICAL**			
		i)	Electrical Supervisor/Basic/General*	
		ii)	Electronic/Instrumentation* Supervisor/IT Network	
		iii)	Communication Equipment	
		iv)	Electrical Supervisor – Cabling/Substations/Lighting	
VI	**OTHERS**			
		i)	Design & Traffic Operation	
		ii)	Intelligent Transportation System	
		iii)	Environment	
		iv)	Road Safety	
		v)	Personal Safety	
		vi)	Materials	
		vii)	Estimation & Billing	
		viii)	Material Procurement Supervisor	
		ix)	Stores Supervisors/Incharge	
		x)	First Aid Centre Incharge	
		xi)	Safety Supervisors	
		xii)	Administration & Public Relation	
		xiii)	Horticulture Landscape Supervisor	
		xiv)	Security Supervisor	
		xv)	Traffic Enumerator	
		xvi)	Asstt. Land Acquision	

Annexure 6

CONSOLIDATED LIST OF TASKS FOR TRAINING OF WORKMEN IN HIGHWAY SECTOR

Activity Area	Category	
I CONSTRUCTION		
	i) Steel Structure Fabrication*	
	ii) Bar Benders*/Steel Fixers*	
	iii) Steel Shuttering Carpenter*/Asst. Carpenter *	
	iv) Mason*/Asst. Mason*	
	v) Painter*/Asst. Painter (Application, Testing, Handling, Storing)	
	vi) Spray Painter*	
	vii) Driller*	
	viii) Rock Excavator/Breaker**	
	ix) Plumber*/Asst. Plumber*	
	x) Tiler*	
	xi) Metal Surface Painter*	
	xii) Fabricators/Fitters/Welders Basic Welding (Gas/Arc)/Gas Cutting/TIG Welding/ Fabrication Welding/ Pipe Welding (TIG Arc)	
	xiii) Riggers/Erectors	
	xiv) Asst. Bar Benders/Asst. Steel Fixers	
	xv) Building Carpenter	
	xvi) Conventional Shuttering Carpenter	
	xvii) Mason (Pavement Finish)/Asst. Mason	
	xviii) Scaffolders	
	xix) Wall Painter	
	xx) Wood Painter	
	xxi) Blaster	
	xxii) Well sinker	
	xxiii) Pneumatic Well Sinker	
	xxiv) Bearing Fixer (Steel, Elastomeric, POT, PTFE)	
	xxv) Expansion Joint Fitter	
	xxvi) Geo Textile/Sub-surface Drains	
	xxvii) Epoxy Mortar, Shotcrete, Polymer Mortar	
	xxviii) Chiseller, Pothole Filler	
II SURVEY		
	Semiskilled Workers	
III TESTING LABORATORY		
	Skilled/Semiskilled Lab Workers	
IV MECHANICAL		
	i) Mechanics/Asst. Mechanics	
	ii) Pump Operators/Vibrator Operators	

Activity Area		Category	
		iii) Heavy Equipment Operators	
		iv) Light Equipment Operators	
		v) Crane Operators	
		vi) Riggers/Fitters	
		vii) Drilling Rig Operator	
		viii) Bentonite Solution Circulation Operator	
		ix) Joint Cutter/Operator	
		x) Dozer/Grader Operator	
		xi) Roller Driver	
		xii) Air Compressor Operator	
		xiii) Bitumen Oil Fired Boiler Operator	
		xiv) Concrete Pump Operator	
		xv) Kerb Casting Machine Operator	
		xvi) Thermo Plastic Pain Machine Operator	
		xvii) Milling Machine Operator	
		xviii) Jack Hammer Operator for Pavement Breaking	
		xix) Grass Trimmer with Machine	
		xx) Air Lock Operator (Pneumatic Sinking)	
		xxi) WMM Plant Operator	
		xxii) Piling Rig Operator	
V ELECTRICAL			
		i) Electrician	
		ii) Electronic/Instrumentation Technicians	
		iii) Electricians/Cable Jointers	
		iv) Repair of Electrical Power Tools	
		v) Lineman (Street & Bridge Lighting)	
VI OTHERS			
		i) Store Assistant	
		ii) Nursing Attendant	
		iii) Firemen	
		iv) Horticulture Workmen (Mali)	
		v) Security men	
		vi) Paramedic	

*Implementation Manual –Skill Development Initiative Scheme – January, 2008 (DGET, MoLE, GOI)

Annexure 7

SUGGESTED LEVELS OF CERTIFICATION OF TRADES UNDER APPRENTICE ACT

	Trade	Duration	Progressive Level Certification
a.	Welder (Gas & Electric)	02 years (new person)	After 12 months = Level -1 After 24 Months = Level - 2
b.	Welder (Structural)	02 years (new person) 01 year (for Level-2)	After 12 months = Level - 1 After 24 Months = Level - 2 After 12 Months = Level - 3
c.	Welder (Pipe & Pressure Vessel)	02 years (for Level-2) 01 year (for Level-3)	After 12 Months = Level - 3 After 12 Months = Level - 4
d.	Electrician	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3
e.	Carpenter	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3
f.	Plumber	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3
g.	Mason (Building Constructor)	02 years (new person)	After 12 months = Level -1 After 24 Months = Level - 2
h.	Mechanic (Earth Moving Plant)	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3
i.	Mechanic cum Operator (Construction Machinery & Equipment)	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3
j.	Building Maintenance Technician	01 year (for Level-2 Mason)	After 12 Months = Level - 3
k.	Sanitary Hardware Fitter	01 year (for Level-2 Mason)	After 12 Months = Level - 3
l.	Fitter (Structural & Reinforcement)	03 years (new person)	After 12 Months = Level - 1 After 24 Months = Level - 2 After 36 Months = Level - 3

Annexure 8

PROVISIONS IN INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS (FIDIC) CONTRACTS

'CONDITIONS OF CONTRACT FOR CONSTRUCTION'

FOR BUILDING AND ENGINEERING WORKS DESIGNED BY THE EMPLOYER

Multilateral Development Bank Harmonized Edition March 2006

Extract from General Conditions

Contractor's Superintendence	6.8	Throughout the execution of the Works, and as long thereafter as is necessary to fulfill the Contractor's obligation, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work. Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language of communications (defined in Sub-Clause 1.4 [Law and Language]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.
Contractor's Personnel	6.9	The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representatives, if applicable, who: a) persists in any misconduct or lack of care, b) carries out duties incompetently or negligently, c) fails to conform with any provisions of the Contract, or d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment. If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.
Records of Contractor's Personnel and Equipment	6.10	The Contractor shall submit, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking Over Certificate for the Works.

Annexure 9

PROVISIONS IN CENTRAL PUBLIC WORKS DEPARTMENT (CPWD) CONTRACTS

CLAUSE 19K

Employment of Skilled/ Semi Skilled Workers	The Contractor shall, at all stages of work, deploy Skilled/Semi Skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/National Institute of Construction Management and Research (NICMAR)/ National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total Skilled/Semi Skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen alongwith requisite certificate from recognized institute to Engineer- In- Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-In-Charge. Failure on the part of contractor to obtain approval of Engineer-In-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100/- per such tradesman per day. Decision of Engineer-In-Charge as to whether particular tradesman possesses requisite skill and the amount of compensation in case of default shall be final and binding. Provided always, that the provisions of this Clause shall not be applicable for works with estimated cost put to tender being less than Rs.5 crores.

Annexure 10

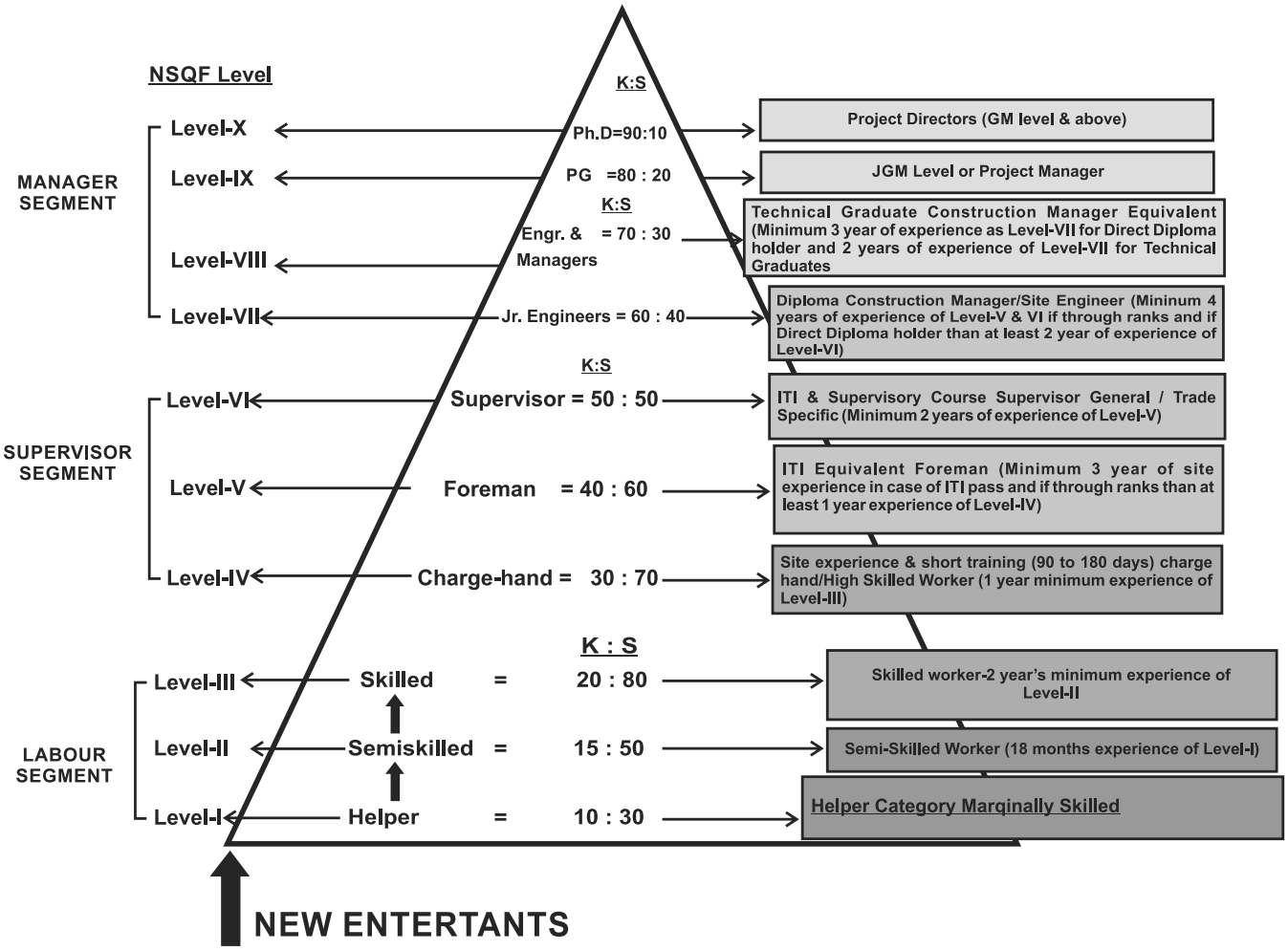
PROVISIONS IN MILITARY ENGINEERING SERVICES (MES) CONTRACTS

26. QUALIFIED TRADESMEN

26.1 In compliance with the Condition 26 of IAFW-2249 (General Conditions of Contracts) the Contractor shall employ Skilled/Semi Skilled tradesmen who are qualified and possessing certificate in particular trade from Industrial Training Institute (ITI) / National Institute of Construction Management and Research (NICMAR)/ National Academy of Construction (NAC), Hyderabad/ similar reputed and recognized Institutions by State / Central Government, to execute the works or their respective trade. The number of such qualified tradesmen shall not be less than 25% of total Skilled /Semi Skilled tradesmen required in each trade. The contractor shall submit the list of such tradesmen along with requisite certificates to Garrison Engineer for verification and approval. Not withstanding the approval of such tradesmen by GE, if the tradesmen are found to have inadequate skill to execute the work of their trades, leading to unsatisfactory workmanship, the Contractor shall remove such tradesmen within a week after written notice to this effect by the GE and shall engage other qualified tradesmen after prior approval of GE. GE's decision whether a particular tradesman possesses requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

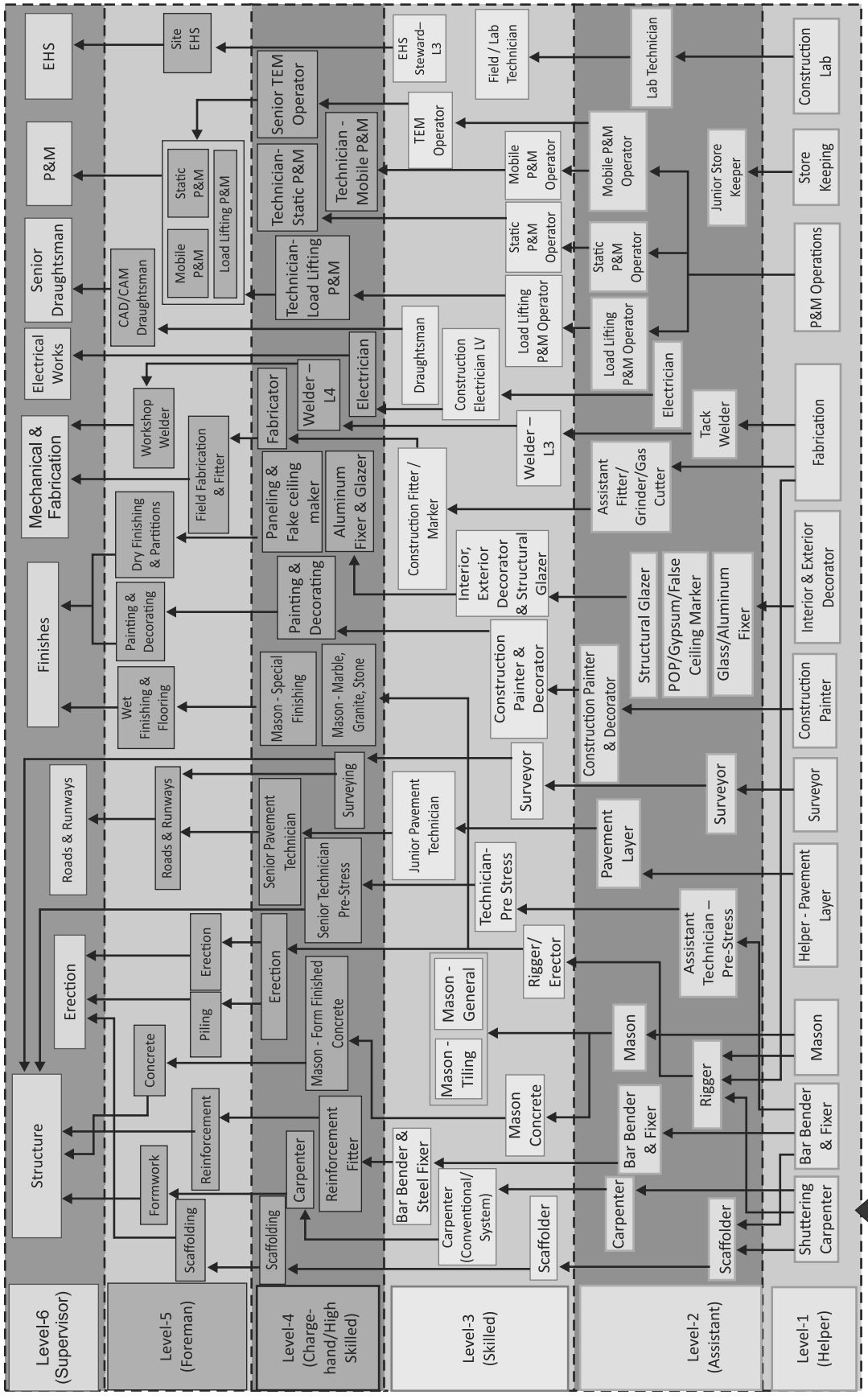
Annexure 11

HIERARCHY PYRAMID



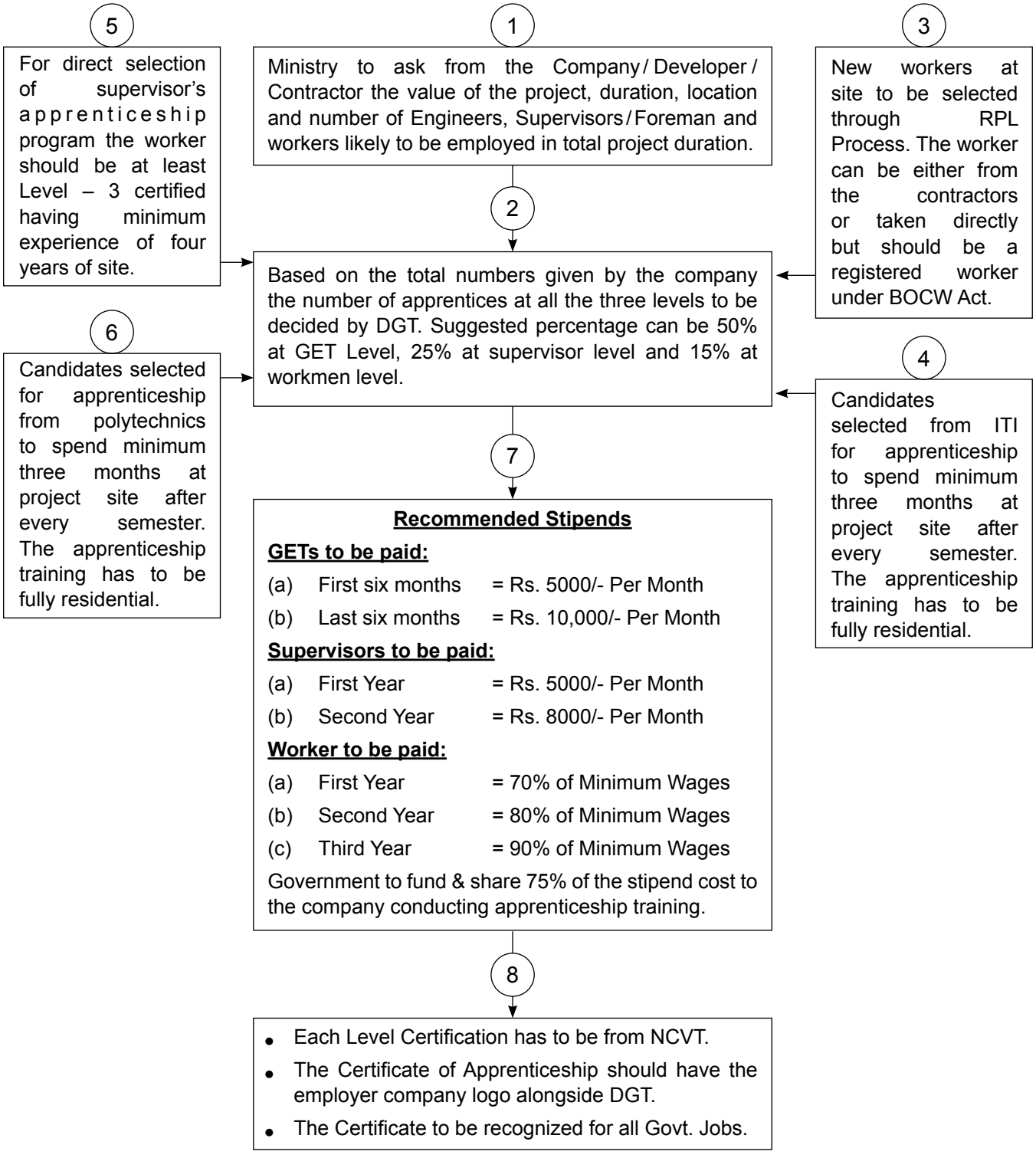
ANNEXURE 12

MOVEMENT OF JOB ROLES



Annexure 13

APPRENTICESHIP ENGAGEMENT FLOW CHART



(The Official amendments to this document would be published by the IRC in its periodical, 'Indian Highways' which shall be considered as effective and as part of the code/guidelines/manual, etc. from the date specified therein)