ANALYSIS OF SITE WORK AND COMPARISON WITH NOS SPECIFICATIONS

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1.1 Abstract

The Construction industry of India is an important indicator of the development as it creates investment opportunities and employment across various related sectors. Looking at the wide scope of employment in this industry it quality of workmanship has become a major concern. A large amount of uneducated workers about 45.6% are employed on the site and this may affect the quality of work done by them. Hence to ensure quality the Construction Skill Development Council of India (CSDCI) developed National Occupational Standards (NOS) . Due to NOS the same quality of the work is achieved in the particular region. The NOS also takes the care of customer's satisfaction.

National Occupational Standards (NOSs) specify the standard of performance, knowledge and understanding when carrying out a particular activity in the workplace. Each NOS defines one key   function in a job role. A set of NOSs, aligned to a job role, called Qualification Packs (QPs), would be available for every job role in each industry sector. These drive both the creation of curriculum, and assessments.

In the construction of a building the cost affecting parameters and also design crucial parameters are shuttering and bar bending. About 60% cost required for this work , mistakes in these activities may lead to structural failure hence quality work is needed to be done for which quality of workmanship is to be improved which will indeed increase the productivity too . A study on qualification packs of Bar bender and steel fixer, Assistant bar bender, Shuttering carpenter and Helper shuttering carpenter. The qualification packs are given in the reference. A analyses of these construction activities as these activities are majorly related to time, cost, and quality. They consume most of the time and cost. The quality of the structure mostly depends upon these activities. Surveying work of the labors related to the qualification packs specified in selected NOS for residential and commercial projects in Pune area for these activities was done

From the results obtained area in which the labors lagged and the possibilities and factors for so were discussed. The dependency of factors was studied which played an important role in concluding the project and providing recommendations.

1.2 Introduction

  Over 94 percent of India's working population is part of unorganized sector. India's Ministry of Labor, in its 2008 report, classified the unorganized labor in India into four groups. This classification categorized India's unorganized labor force by occupation, nature of employment, especially distressed categories and service categories. The unorganized occupational groups include small and marginal farmers, landless agricultural laborers, sharecroppers, fishermen, those engaged in animal husbandry, beady rolling, labeling and packing, building and construction workers, leather workers, weavers, artisans, salt workers, workers in brick kilns and stone quarries, workers in saw mills, and workers in oil mills. A separate category based on nature of employment includes attached agricultural laborers, bonded laborers, migrant workers, contract and casual laborers. Another separate category dedicated to distressed unorganized sector includes toddy tappers, scavengers, and carriers of head loads, drivers of animal driven vehicles, loaders and unloaders. The last unorganized labor category includes service workers such as midwives, domestic workers, barbers, vegetable and fruit vendors, newspaper vendors, pavement vendors, hand cart operators.

Now to organize such a sector and to improve the quality of work in the civil industry especially there are NOS standards. NOS standards have occupied every sector in every industry. NOS have basically covered all industries

like the dairy industry, food industry, etc. It is set by the csdc i.e. the construction skill development council of India to improve the level of skill and to raise the quality of work done by the workers.

In the present scenario of the construction industry in Pune, construction work like bar bending and shuttering are the most crucial activities in terms of design aspects since they require most of the money and time as well. These activities are directly connected with quality of construction.

❖ Set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.
❖ The work done under this project will be used by builder association for assessment at various levels in an organization.
❖ Identifying training needs and skill gaps.
❖ Help developing syllabus for training and education courses.
❖ Help for next review of NOS standards.

1.3 NOS specification

National Building Code (NBC) The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works by the Public Works Departments, other government construction departments, local bodies or private construction agencies. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); building and plumbing services; approach to sustainability; and asset and facility management.

National occupational standards

TABLE NO 1- COMPARISON OF VARIOUS STANDARDS\

NBC	IS	NOS
NBC has methodologies to perform different activities related to construction work right from foundation activities to finishing activities.	IS contains standards regarding strength, safety for different materials related to construction work.	NOS has methodologies to perform different activities for different construction people (like bar bender, helper bar bender, shuttering carpenter, etc).

The Table given below shows the different aspect of the various codes available. Before selecting the codes for comparison of actual site works with the standardized practices comparison of some codes available were studied and based on these aspects the codes were selected

Given the vast scope in these standards it was difficult to study standards related to specific activity, whereas NOS concentrated on particular activities. National Occupational Standards (NOS) was included by Construction Skill Development Council by National Skill Development Council (NSDC). NOS include standards and guideline for qualifying for a specific job. NOS give the compulsory and optional standards to be followed by person for a particular job role. NOS for a particular qualification pack are divided into three criteria that are Performance Criteria, Knowledge and Understanding and Skills.

1.4 Research methodology

1.4.1 Study of NOS:

NOS standards are qualification pack for different activities which are been carried out on site such as bar bending, shuttering, helper bar bender, helper shuttering carpenter etc. and these qualification packs are divided in three parts i.e. Performance criteria, knowledge and understanding and skills of a person performing a specific activity on site. From all these activities we selected bar bending and shuttering activities because these activities are majorly related to time, cost and quality. They consume most of the time and cost. The quality of the construction work depends upon these activities.

1.4.2 Preparation of questionnaire:

The information needed to be collected was first written down based on the study of National occupational standards, keeping in mind the information needed different questions were prepared and the questions were written. Questionnaires were so designed that compatibility of the actual work with the national occupational standards related to the qualification pack could be checked.

1.4.3 Site survey

All the questions from the prepared questionnaires were asked and responses of the workers were noted, based on the site experience later some questions were added to ensure more output from the workers and better communication. The prepared questionnaire was used as base for site survey but along with it observations of the working practices carried on site was important for better understanding the actual scenarios.

1.4.4 Analysis of data

The data collected from the site was compiled and sorting of parameters and its sub-parameters were done by studying the NOS and understanding the interdependency. The parameters were scaled from one to five, one being the lowest scale and five being the highest scale. Scaling is done depending on the feedback given by selected persons working on their job role. After scaling was done comparison of this data by using Relative Importance Index (RI Index).

1.4.5 Result and conclusion

The analyzed data was studied and discussed based on which how well the standards are been followed by the workers related to a qualification pack by quantifying the parameters, factors and the areas that need to be focused were found out by analyzing, the RI of all parameters, and accordingly ranks were given, lower the RI lower is the rank. Out of all the parameters the first five ranked parameters were mainly focused on, while giving recommendations. From the results obtained area in which the labors lagged and the possibilities and factors for so were discussed. The dependency of factors was studied which played an important role in concluding the project and providing recommendation.

TABLE 2 -Overall analysis of parameter

	Bar bender			Helper bar bender			Shuttering carpenter			Helper shuttering carpenter	
CON1		Rank		Rank		Rank		Rank		Rank		
Performance criteria	4.03	17	3.7	14	3.91	12	3.77	14				
Knowledge and understanding	3.55	7	2.84	3	3.98	14	3.53	12				
Skills	3.55	7	2.54	1	3.86	10	2.93	2				
CON2												
Performance criteria	3.14	2	3.75	15	4.19	16	3.11	7				
Knowledge and understanding	3.85	14	3.09	8	3.97	13	3.51	11				
Skills	3.94	15	4.05	17	3.86	10	2.93	2				
CON3												
Performance criteria	4.02	16	3.08	7	4.29	18	3.77	14				
Knowledge and understanding	3.66	10	3.24	9	4.24	17	3.02	5				
Skills	3.75	13	4.04	16	3.84	9	3.12	8				
CON4												
Performance criteria	3.38	6	3.33	11	3.98	14	3.63	13				
Knowledge and understanding	4.25	18	2.99	5	3.54	8	3.36	9				
Skills	3.74	12	3.46	12	3.44	7	3.47	10				
CON5												
Performance criteria	3.19	3	4.2	18	3.27	2	2.99	4				
Knowledge and understanding	3.34	5	3.31	10	3.3	4	2.73	1				
Skills	3.71	11	3.06	6	3.41	6	3.04	6				
CON6												
Performance criteria	3.31	4	2.94	4	3.29	3						
Knowledge and understanding	2.73	1	2.72	2	3.7	1						
Skills	3.6	9	3.67	13	3.32	5						

1.4 Recommendations

1.4.1 Bar Bender and Steel Fixer

1. The bar bender should known basic properties of steel such as types of grade, size, strength , unit weight
2. Communication skill of the person should be developed. He should convey important work related information to superior and co-workers
3. He must know how to plan and organize work in proper manner to complete work as per schedule and quality.
4. He should know potential solution to minimize waste and to avoid delays

1.4.2 Helper Bar bender

1. The helper bar bender must be able to differentiate steel on the basis of grade and size
2. He must know different type of ties to avoid displacement of bars
3. He must be able to ensure sufficient availability of material on site
4. He must be able to identify and organize right scaffolding material and standard procedure for erection of scaffolding
5. He must know basic arithmetic calculation and conversion of unit of measurement
6. He must be able to identify the quality of reinforcement by visual inspection
7. He must be able to identify near miss.

1.4.3 Shuttering Carpenter Conventional

1. He must be able to arrange material tools in short falls and analyze work which can result in delay.
2. He must know different types of knots, tolerance limit for shuttering of various structures.
3. He must know all the types of joints and knowledge of marks and layout of form shuttering.
4. He should support his co-worker during problems for smooth functioning on site.
5. He must adopt standard practices to minimize wastage and complete work as per schedule with quality.

1.4.4 Helper shuttering carpenter

1. He must be able to identify slings, shackles and lifting belts and barricade area of work
2. He must know how to make different timber joints such as lap joint, mortes joint, tennon joint and dovetail joints
3. He must know how to check verticality, placing base plate and sole boards

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