Evolving Strategy for Capacity Building of Masons, Carpenters and Wire Binders at Panchayat level for Safe Construction

---- Study, 2012 ----

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PREFACE

The state of Hiimachal Pradesh is facing rapidly growing building stock. As per record, 80% of the buildings come under the informal sector, which is basically un-regulated and non-engineered. Looking at the history, we will find enough number of cases of collapse of these un-engineered buildings due to the poor construction quality. And the main reason of poor construction is due to private house owners employing masons with no training.

The study report pertaining to capacity building of masons, carpenters and wire binders at the Panchayat levels for safe construction in Himachal Pradesh has come out in form of a comprehensive strategy, on the subject matter. Overall, the report is an attempt to analyze the current scenario in the state, carry out the need assessment and analysis, based on inputs received from concerned stakeholders, conduct mapping of institutions/ resources at national and state level, and come out with the appropriate training design and certification process, along with challenges and proposed recommendations.

The report begins with a brief background, and building typologies exist in Himachal Pradesh, and afterwards it covers the status of masons training in India, based on the inputs received from nodal agencies and institutes at state and national level. Later the needs assessment and analysis has been carried out, based on the survey conducted in the month of December. Over 120 participants gave their specific inputs on the subject matter. On the basis of these inputs, the training design and certification methodology has been proposed, which can best fit in context of Himachal Pradesh. In the later part, the report covers the challenges and concludes by giving specific recommendations.

The study has been carried out in one and half months period, and there are obvious limitations related to both qualitative and quantitative data gathered. The analysis has been carried out based on the information available, through primary and secondary sources, one to one meetings, and the focused group discussions.

The study report has come out with a comprehensive analysis based strategy, to impart skills and training to the major stakeholders such as masons, carpenters and wire binders, at the Panchayat level, in Himachal Pradesh.

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We appreciate the support extended to us by the concerned institutions, agencies and individuals, both at national and at the state level, especially for carrying out the sample surveys with over 120 respondents from various entities. The study report would not have been possible without their support, in terms of time and efforts. Specifically the cooperation of the following persons and organizations is acknowledged.

Study Team of SEEDS Technical Services

- Irrigation & Public Health Deptt (I&PH), Govt.
- HP Housing & Urban Development (HIMUDA), Govt
- Public Works Department (HP PWD), Govt.
- Urban Development (UD)department, Govt.
- Department of Town & Country Planning (TCP, Govt.
- Technical Education Deptt, VIT, HP Govt.
- Rural Development (RD) & Panchayati Raj (PR) Deptt. Govt.
- HP Road & Other Infrastructural Development Corp, Govt.
- SSA Education Wing, Govt.
- Satluj Jal Vidhut Nigam, Govt.
- State Council of Science Technology & Environment, Govt.
- National Hydroelectric Project Corporation (NHPC), Govt.
- HP BSNL, Govt.
- HP State Electricity Board (HPSEB), Govt.
- Sai Engineering Foundation, NGO
- Masons, car painter & wire binder Union
- Private Contractors Union
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- SEEDS Masons Association (SMA) - Private
- Sh. Madhu Kesu, Habitat Technology Group (HTG) - NGO
- National Centre for People's Actions in Disaster Preparedness (NCPDP) - NGO
- Human Settlement Management Institute (HSMI) – Govt
- Building Materials & Technology Promotion Council (BMTPC) – Govt
- Gujarat State Disaster Management Authority (GSDMA) – Govt
- Sh. Sandeep Virmani, Hunnarshala - NGO
- Sh. Vivek Rawal, People in Centre – NGO
- Sh. Chandra, Quake School –Private
- Sh. Hari Kumar – Geo Hazard Society

Chapter One - Background

Construction industry in India has evolved over the years from a government led enterprise to an enterprise led largely by the private sector and has emerged as a major source of employment. The construction sector accounts for about 40% of development investment made in the past 50 years, around 16% of the nation's population depends on construction for its livelihood. The industry employs about 3 Crore people, creating assets worth over 20,000 Crore. The total contribution of the construction sector to the GDP has been estimated at more than 5% and its contribution to gross capital formation has been assessed at 78%, which makes it a significant contributor to the national economy. However, despite the phenomenal growth of the sector availability of trained manpower has continued to be a major issue since the industry still draws bulk of its workforce from the informal sector. Dominance of the unorganised sector can be gauged from the fact that in the housing segment alone, unorganised sector accounts for 75% of the output. Further, according to available reports 82% of the workers in the construction sector are unskilled workers and 10% are skilled labourers. Rest of the workers are technical personnel such as engineers, supervisors etc. The informally developed skill of the unorganised sector workers have a significant adverse impact on the quality of construction and make it difficult to use new materials and techniques of construction.

The problem is exacerbated, when construction is taking place in an area at high risk to seismic activity. as per the vulnerability atlas of India, Himachal Pradesh, being located in zone IV and V is highly vulnerable to earthquakes. Earthquakes in such regions can cause widespread damage to poorly designed structures. Due to the hilly topography of the state, it also faces the risk of secondary hazards like landslides, and in addition to the resident population, a large percentage of floating tourist population, is also at risk.

Despite growth of construction activity in the state, driven by increasing demands of a thriving economy, availability of skilled construction workers continues to be an issue. This scarcity is most evident in the lack of skilled masons required to carry out retrofitting, construction and re-construction work. The role of masons in ensuring construction of safe buildings cannot be ignored since they are intrinsically involved in the construction process and are largely responsible for implementation of construction techniques that would have a bearing on the safety of the building. Shortage of skilled workers has thus had a serious adverse impact on the quality of construction, leading to an overall degradation of the built environment in the state.

Interestingly, as the Study Team found out through interviews with house owners in the State, the Mason is also the first point of contact, whenever the house owner decides to undertake construction in his house. Almost no technical knowledge, validation of practices, or technical supervision takes place at the time of construction.

Conditions such as described above reinforce the need for evolving a strategy for institutionalized approach to grassroots level training of masons and other allied skills in the State. While trained masons would help in standardization of construction practices in the State, specialized skills may be added for example, on retrofitting structures that do not conform to the required safety norms. Formal training to workers will enhance their wage earning potential. In the long run trained masons stand to benefit from growing demand of the construction industry. However, challenges remain. Mobilizing and motivating existing masons who are already in demand will be a problem. Moreover, they are spread across and bringing them under a formal environment would be difficult. Likewise, the training curriculum will need to accommodate a rather uneven capacity of masons in the State.

This report is expected to provide inputs towards involving a comprehensive training programme in the State of Himachal Pradesh for Masons, Carpenters and Wire Benders. It lays out opportunities and challenges in designing such a programme followed by a broad set of recommendations on the content, structure and enabling linkages for the programme.

Chapter Two - Building Stock in Himachal Pradesh and Construction Practices

As per the vulnerability atlas of India 2007, in Himachal Pradesh aprox 69.5% houses are made of mud, unburnt brick and stone wall, which are at high risk, especially in case of earthquake scenario, considering the geographical background of the state, as it comes under earthquake zone IV and V. Further, according to census 2011 population of Himachal Pradesh, the state stood at 68,56, 509 recording a growth of 12.81%. Growing population in the state of Himachal Pradesh has also led to increasing demand for land and buildings in the state.

The state has seen a rapid increase in the construction activity, in recent years. Use and demand of heavy construction materials such as reinforced cement concrete and bricks has tremendously increased, without proper implementation of norms and procedures these have drastically added to the vulnerability. Poor siting of these structures and workmanship can result in dangerous building collapse.

Poorly designed and constructed RCC structures cause very significant life and property loss, as has been witnessed in earthquakes in Jabalpur, Gujarat, Kashmir and Sikkim in recent years.

Common Structures .in Himachal Pradesh

This can be one large vulnerability factor, and a cause for concern in Himachal Pradesh given the significant shift to RCC construction across the state, and more prominently in the urban centres. . Although RCC buildings are around 5% of the total stock, this is where risk of heavy collapse is at is highest, and is continuously increasing. There is an important need to address this issue more urgently, keeping in mind the upcoming demand. The new construction in the Hiimachal Pradesh For an example today Shimla consists of more than 30,000 households in which more than 90 percent are built using stones, mud, unburnt and burnt brick as the basic walling material. Of these 55 percent are built using lightweight roofing material and 40 percent have flat roof. However this stock is considered under very high category of risk. This is normally scenario in all the major cities of Himachal Pradesh.

In addition, poor use of construction material and quality and absence of ductile detailing of existing buildings is a problem area worth consideration. Absence of durability design and lowly maintained buildings pose a high hazard to the building stock.

On the other hand, a variety of traditional construction techniques exist in various parts of the state and though limited use of these techniques is made in the state they are significant since they have been tested for seismic safety over time. The masons in the state are also most familiar with these techniques and have been known to attempt replication of these techniques in modern structures. The traditional styles of construction vary across the state presenting a diverse building tradition. Muds, stone and wood are the main materials used in traditional construction. The most common type of construction is done using walls known as “Kathkuni” walls. Structures constructed using this technique consists of a grid of interlocking cedar sleepers within which dressed or raw stones are packed. This style of construction is practiced in the districts of Shimla, Kinnaur and Kullu. In other regions the structure consists of timber uprights, beams and braces with dressed stone blocks as infill material without any cementing material. This wall type is popularly known as “dhajji” wall. In Satluj valley walls are made of alternate courses of dry stone masonry and timber. In the hamlets located in Ravi valley houses are built mostly with dried masonry without using any alternate layers of timber. These walls are plastered with mud both inside and outside. In the hamlets located in Ravi valley walls of traditional

houses are built using dry masonry without using any alternate layers of timber. A common construction technique in hill areas is to make lower storey of the house in dry stone masonry, without any timber beams, and make the upper storey exclusively in timber. The upper floor is generally projected on all four sides and supported on posts and brackets. However, in some parts of the state like upper Kinnaur, Lahaul and Spiti the use of stone is limited to the construction of the plinth. The superstructure is made of mud using rammed earth technique or adobe wall technique.

Taking all of these facts into consideration, the building stock and construction practices in Himachal Pradesh can be summarised as follows:

1. **Reinforced Cement Concrete (RCC) Frames** This is the most common construction practice at present in Shimla. In these buildings concrete along with steel reinforcement bars are used for frames and frame is filled with bricks and mortar
2. **Confined Masonry**: Most modern masonry buildings built using brick/stones and cement mortar are confined using RCC. Many traditional masonry buildings are confined using steel or/and wooden elements.
3. **Modern Masonry**: This refers to modern masonry buildings built using bricks/stones and cement mortar and are not confined or reinforced. These can be few in numbers.
4. **Traditional masonry:** Old buildings built using stone masonry and lime mortar. These are also not reinforced or confined. Heritage structures are very common example
5. **Wood/Steel frame with Infills**: The load bearing members are made of either Wood or Steel or both. Mostly older and heritage structures are examples
6. **Adobe:** Known as Kathkuni in local language, in which the mud and/or lime masonry is confined in a wooden frame.
7. **Shacks:** Includes single storied mud houses and GI sheets, tarpaulin, bamboo etc.

The proposed strategy for capacity building of masons, carpenters and wire benders will be influenced by demand of particular construction practices in the State. Considering significant growth in RCC framed structures, and considering the high risk of poorly designed RCC Builidngs in high riks seismic zones, the training content will need to specifically address such practices in detail. Ideally, a course will have to take into consideration:

(i) A basic level of understanding applicable to all prevelant construction practices in the State; this will help develop basic levels of standardization in content and pedagogy across the state

(ii) Highlight good practices in traditional structures that could be retained, incorporated in contemporary practice; Masons have been used to such practices without the necessarily being aware of their positive features for example, their resistance to seismic vulnerability

(iii) At a advanced level, the content can branch into specialized topics.

Chapter Three - Masons Training in India: Experience from Practice

The Study Team carried out an extensive national level background research towards evolving a strategy for capacity building for the State of Himachal Pradesh. The research was carried out under two broad heads (i) Content and Pedagogy (ii) Market Linkages. The former includes all aspects related to content, syllabus, teaching methodology and certification; while Market Linkages pertains to all issues related to mobilization, recognition, employment and other environmental factors that have a strong bearing on the proposed strategy.

The Study Team did an extensive institutional mapping exercise at national and Himachal Level. The exercise was aimed at gauging current institutional capacity. All institutions mapped in the exercise were assessed on their strengths with respect to the two categories described above.

In parallel, the Study Team did a sample study of Masons, House-owners and building professionals in Himachal to assess their existing capacity with respect to their knowledge, awareness, skill levels and their expectations from the proposed training programme.

Finally, the Study Team interviewed 14 well known experts in the field who have been involved in the mason training provision in the country and have considerable experience in assessing impacts of such training. Their inferences have been most useful in evolving the Strategy for Himachal Pradesh.

(i) Mapping of institutions, agencies at national level

A number of institutions have been found which are involved in the area of training. A total of 12 institutions were surveyed at national level, 5 were government, 3 were private and 5 were NGOs. National level institutions involved in training were:

- Construction Industry Development Council (CIDC) - Govt
- Larsen & Toubro Construction (L&T) - Private
- SEEDS - NGO
- Habitat Technology Group (HTG) - NGO
- National Centre for People's Actions in Disaster Preparedness (NCPDP) - NGO
- Human Settlement Management Institute (HSMI) – Govt
- Building Materials & Technology Promotion Council (BMTPC) – Govt
- Gujarat State Disaster Management Authority (GSDMA) – Govt
- Jammu & Kashmir Technical Education Department – Govt
- Ambuja Cement Company – Private
- JK Cement Works – Private
- Hunnarshala - NGO

Apart from above agencies, there are few other institutes and organizations, which are associated with the masons training programme and carry out the same in as part of their own works.

Out of these listed 12 notable institutes and organizations majority of them 11 are actively involved in the exclusive masons training programmes directly, and 7 of these national level nodal agencies are associated with the certification process. Apart from it, broadly 6 nodal agencies have also very strong market and industrial linkages, which are also directly related to the mobilization and recognition. And 3 of these leading agencies provide the livelihood assistance as well, through absorption and usage of this trained and certified manpower, at site.

Through the study, one thing is coming out quite clearly that all these nodal agencies, institutes and organizations are intended to develop the capacity building of construction workers at national level, especially the masons, with the objective to promote and institutionalize the safe construction practices in India.

While carrying out the mapping of national level and prominent state level institutions, it was found that there are agencies like CIDC (Govt. supported) and L&T (Pvt.) which conduct three months extensive masons training programmes, targeting to upgrade technical skills and knowledge as well as addressing the behavior and attitude part, also as part of the training. However because of comparatively longer duration training programme, the cost component plays a very vital role here. As the livelihood is an issue for masons. Practically they find it difficult to sustain without earning for such a longer period. In case of L&T, these masons are mostly internal, and the expenditure (aprox. 21,000 Rs per mason for three months) is absorbed by L&T. The construction unit of L&T has developed 7 mother training centers across India, exclusively for masons and allied trainings for construction workers. Here the training assessment is carried out by way of productivity analysis. Whereas in case of CIDC, the masons are trained at site, as far as possible. However in an allocated budget of merely Rs. 6000/ - per trainee for three months, it is very tough and challenging to meet the training requirements.

Following the earthquake in 2001, in a unique experiment the Gujarat State Disaster Management Authority (GSDMA), Govt of Gujarat, introduced masons certification programme in the state. Under the programme the agency invited private organizations, institutes to conduct training on site. The selected training agencies identified masons and mobilized them for training and participation in the certification programme. A number of groups of masons formed by the training agency. After completion of training, the training agency requested Gujarat Council of Vocational Training (GCVT) to assess the masons and provide certification. The competency certification provided when the masons cleared the assessment test for all the training modules. After the final certification of masons, the agency that undertook training was reimbursed up to Rs 2000/- per mason as the cost of training imparted to them.

SEEDS, an NGO working in post-disaster recovery did significant work in Gujarat with support from GSDMA. The prime objective of the training programme is to impart training to masons to ensure quality construction and create safe living conditions, with a emphasis on the disaster resilient technologies. SMA has done significant work in Gujarat with support from GSDMA, and trained over 2000 masons. Apart from it, SEEDS has conducted masons training programmes of shorter durations, in Himachal Pradesh, Orissa and the other parts of India.

NCPDP, primarily a Gujarat based NGO, has carried out programmes of skill up-gradation for the masons of 2 days to 20 days duration. In 2 day training the masons work on small samples of various measures while in 20 days they fully retrofit a small building and receive training during the work at different times. NCPDP has also intervened in Maharashtra, Uttarakhand, and Jammu & Kashmir.

Hunnarshala, another leading NGO working in post disaster recovery, has also carried out various masons training programmes, including the training of trainers, and specialized masons training for construction and earthquake resistance. Besides construction details the training covers structural principles, performance of buildings in disasters, basic calculations, reading drawings, roles and responsibilities of masons, communication skills. Hunnarshala has intervened in Gujarat, Bihar and Rajasthan.

Other Non-Government agencies like Habitat Technology Group, have also carried out state level training programmes through their five day masons training programmes, in sustainable and viable building technologies, in Kerala, Uttarakhand, Gujarat and other parts of the country.

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Though the efforts have been made by various NGOs to train masons, these training programmes are generally linked to larger projects, aimed at rehabilitation and recovery or other public social housing programmes.

From Government sector, Ministry of Rural Development, Urban Development, HRD, MHA and HUDCO are primarily involved with the masons training programmes. Further, the programmes to assist the States/UTs in training and certification of masons have been worked out in consultation with Housing and Urban Development Corporation (HUDCO) and the Ministry of Rural Development. Apart from CIDC, the other agencies like Human Settlement Management Institute (HSMI), Building Materials & Technology Promotion Council (BMTPC), Gujarat State Disaster Management Authority (GSDMA) and Jammu & Kashmir Technical Education Department, are also actively involved in mobilizing the masons for training, their recognition through the certification and creating market linkages to promote the sustainable technologies, ensuring the safety aspects. However, across all agencies and institutions, a common need for standardization and benchmarking training was felt. An important constraint was to create easier access and motivation for workers in the informal sector to avail such training facilities.

Private sector organizations are taking up the training programmes as part of their corporate social responsibility activities as well as building the in house capacities in construction field. The Corporate world has come forward (especially the cement manufacturing and construction companies) in order to address this pertinent issue of safe construction, which actually starts from the masons training. Other than L&T, now the Ambuja Cement Company, JK Cement Works and few other corporate agencies have started providing such trainings aligning with their core work as well as through their CSR initiatives. These agencies have conducted the masons trainings in UP, Gujarat, Himachal Pradesh and are now intervening in few other states as well, with the objective of upgrading skills for constructing safe structures.

For further detail on the mapping of national level institutions, and agencies, refer Annex Table – 1.

(ii) Mapping of institutions and nodal agencies in Himachal Pradesh

Based on primary and secondary data collection, the current status of construction workers training programmes (including masons training) had come to know. And it was found that the following 20 prominent institutes, agencies are actively involved with masons (directly or indirectly), at the state level (including Government, NGOs and Private agencies):

- Technical Education Deptt, VIT, HP Govt.
- Irrigation & Public Health Deptt (I&PH), Govt.
- State Administrative Training Institute (HIPA), Govt.
- Urban Development (UD)department, Govt.
- Department of Town & Country Planning (TCP, Govt.
- HP Housing & Urban Development (HIMUDA), Govt.
- Rural Development (RD) & Panchayati Raj (PR) Deptt. Govt.
- Public Works Department (PWD), Govt.
- HP Road & Other Infrastructural Development Corp, Govt.
- SSA Education Wing, Govt.
- Satluj Jal Vidhut Nigam, Govt.
- State Council of Science Technology & Environment, Govt.
- National Hydroelectric Project Corporation (NHPC), Govt.
- HP BSNL, Govt.
- HP State Electricity Board (HPSEB), Govt.
- Associate Cement Company (ACC), Private
- Ambuja Cement Company, Private
- Sai Engineering Foundation, NGO
- Masons, car painter & wire binder Union
- Private Contractors Union

Out of the above listed 20 notable institutes and organizations, majority of them (15) are actively involved in providing the livelihood assistance to masons, by absorbing and utilizing them through various programmes. Apart from it, broadly 4 nodal agencies have very strong market and industrial linkages, which are also directly related to the mobilization and recognition. And 5 of these leading agencies provide masons training. Apart from it there are 82 ITIs and 30 polytechnics, engaged in providing various types of vocational trainings and other allied activities.

The Study Team also studied available training infrastructure in Himachal Pradesh, and its effective utilization. At present in Himachal Pradesh, there are 19 Engineering colleges (including IIT, NIT and other Government and Private institutes) and 30 Polytechnics (10 Government + 20 private), and also 82 ITIs (75 Government + 7 Private) exist. Most of these institutes have their own training centers to run various training programmes. Refer Annex. Table 3 for detail about institutes located district wise.

State also has a strong human resource base that can potentially be associated with the proposed Capacity building strategy. Looking at the existing strength of the staff for training with various departments, it was found that there are around 9093 Government officials, including Architects, Engineers, Construction supervisors and masons representing major departments like PWD, HIMUDA, TCP, UD, SSA, HPSEB, RD, I&PH, PR etc. The department wise detailed information is available in Annexure Table 4. Apart from it, there are 269 architects available in private sector, as per TCP registration record. With reference from the unorganized sector data, it was found that there are aprox 24,500 – 26,000 masons present in Himachal Pradesh. And the total number of Panchayats in Himachal Pradesh is 2430. Therefore, on an average there are about 5 to 10 masons available per Panchayat, in the unorganized sector. However these figures are estimated, the actual figures may vary a little bit.

For further detail on the mapping of Himachal Pradesh institutions and agencies refer Annex Table – 2.

The mapping exercise at National and Himachal State Level, as detailed above, illustrated the following highlights:

(i) Very few formal institutions were found to be undertaking formal training for masons on an ongoing basis.

(ii) Most training has been undertaken as "accompanying" activity to a larger public programme, e.g. a social housing programme such as IAY, post-disaster recovery. Such training have not sustained beyond the life of the project they have "accompanied".

(iii) Institutions involved in training award their own certificates. There is no standard certification system common to institutions.

(iv) Government and private institutions are not actively involved in mobilization. NGOs, on the other hand, have been strong in mobilization, but they rely on government and the private sector for recognition (including certification) and forward linkages.

(v) In Himachal Pradesh, very few institutions provide training. These are mostly in allied entry level courses. However, a strong network of existing institutions indicates accountability of adequate infrastructure. A future training course must leverage the potential of such infrastructure already in place in the State.

Chapter Four - Needs Assessment and Analysis

Purpose

To get the existing capacity, which will help in evolving strategy for carrying out the masons training.

Objectives

- To assess the current levels of education and skills of masons,
- To understand the market linkages with reference to masons wages, employment, and level of engagements,
- To understand expectations on pedagogy of proposed masons training.

Methodology

A training needs analysis was done to determine the gap between what is required for an effective strategy for capacity building and the currently existing levels of capacity. The Analysis was carried through primary surveys on the field, as well as deriving expert views on a effective strategy based on experience of institutions and individuals at national level.

The primary survey includes the representation of rural and urban areas. As a first step the questionnaires were developed to capture the insights of all the stakeholders, including the masons, carpenters, wire binders, contractors, house owners & residents, Engineers, Architects, key Government officials, NGOs and other nodal agencies, associated with the subject matter. The sample size for masons, carpenters and wire benders was 120. In Himachal Pradesh, the focused group discussions carried out with masons, carpenters and wire binders and discussions held with Engineers, Architects, Contractors, House owners & residents, and with key Government officials. At national level, consultation meetings held with nodal leading agencies, (including Government bodies, Corporate, Private agencies and NGOs) and further subject specific online interviews conducted with national level experts, to capture their viewpoints.

Finally the valuable inputs received from all stakeholders, comprising 60 construction workers (primarily masons, and also including the carpenters and wire binders), 12 Engineers, Architects, 7 House owners, 5 contractors, selected Government officials and around 20 key agencies, in Himachal Pradesh. In Delhi total 12 lead agencies of this specific field contributed their inputs in required form, followed by 7 national experts across the country, they provided their inputs through emails.

Survey Results

Following are the results of surveys carried out on various aspects, which are interlinked with the objective of evolving strategy for capacity building of masons, carpenters and wire binders, required for safe construction.

1. **Sensitization of construction workers about Disaster Resilient features:** According to the **survey** data 90% of construction workers are not aware of the disaster resilient features, which is substantially a very high number. This needs to be converted on the other, i.e. sensitization of construction workers towards the disaster resilient features.

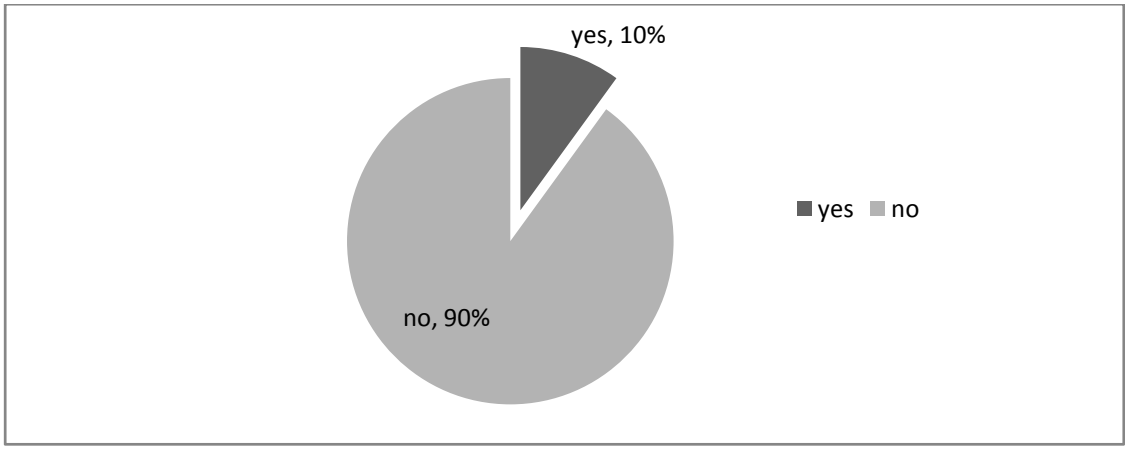
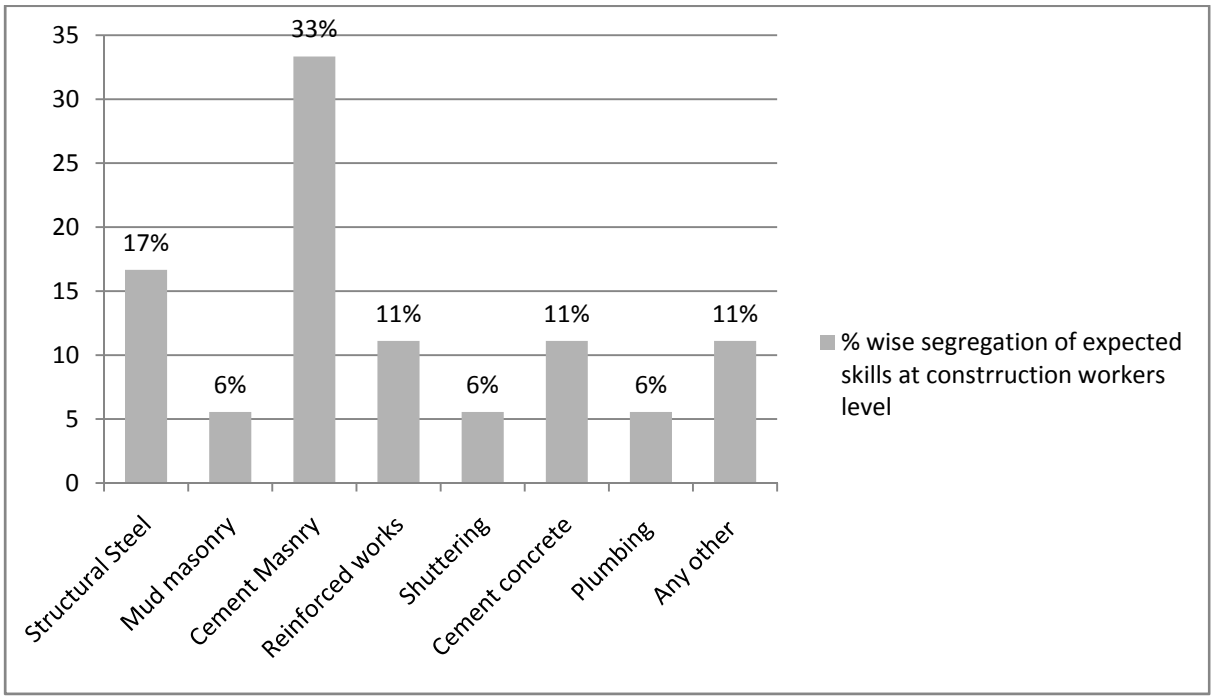


Chart 1 - Awareness of construction workers about Disaster Resilient Features

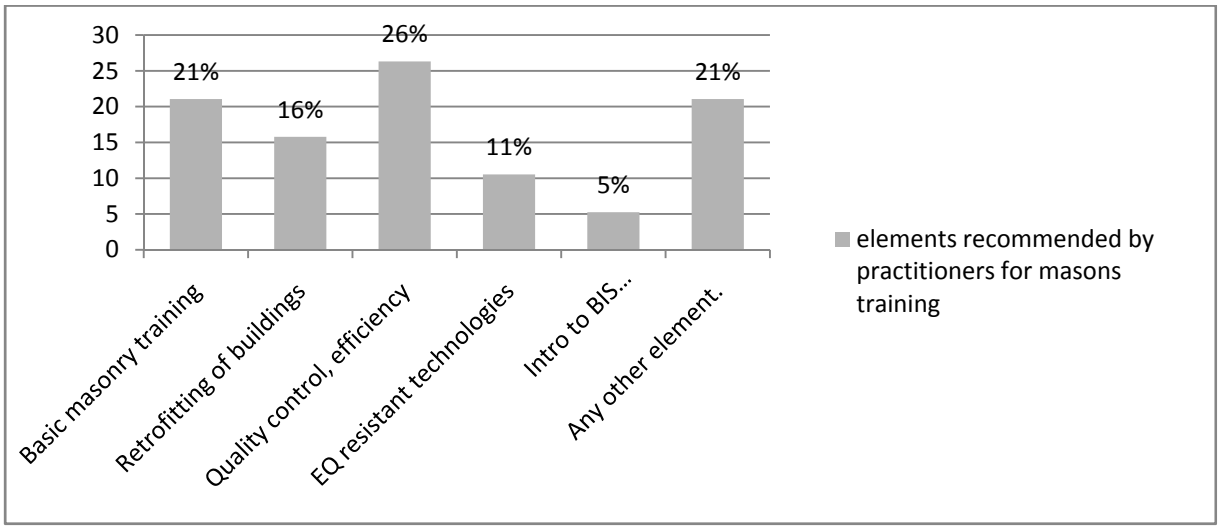
2. **Specific skills – The construction workers are looking to learn:** The collected survey data indicates that 50% of construction workers are interested in cement masonry and structural steel work. And after that they are equally interested (11%) in cement concrete and reinforced works, and are least interested in the plumbing, shuttering, mud work.

Chart 2 – Skills, construction workers are looking to learn



3. **Training elements recommended by the Practitioners for masons** It is evident from the survey results that according to the practitioners, the quality control and efficiency (26%) are the major issues need to be addressed, at the masons level. Further, they should also be trained in basic masonry & allied skills, retrofitting of existing buildings, and on earthquake resistant technologies. Once these masons will get trained under the guidance of practitioners/ experts/ master masons, they will definitely be able to contribute a lot in future after learning these specific skills.

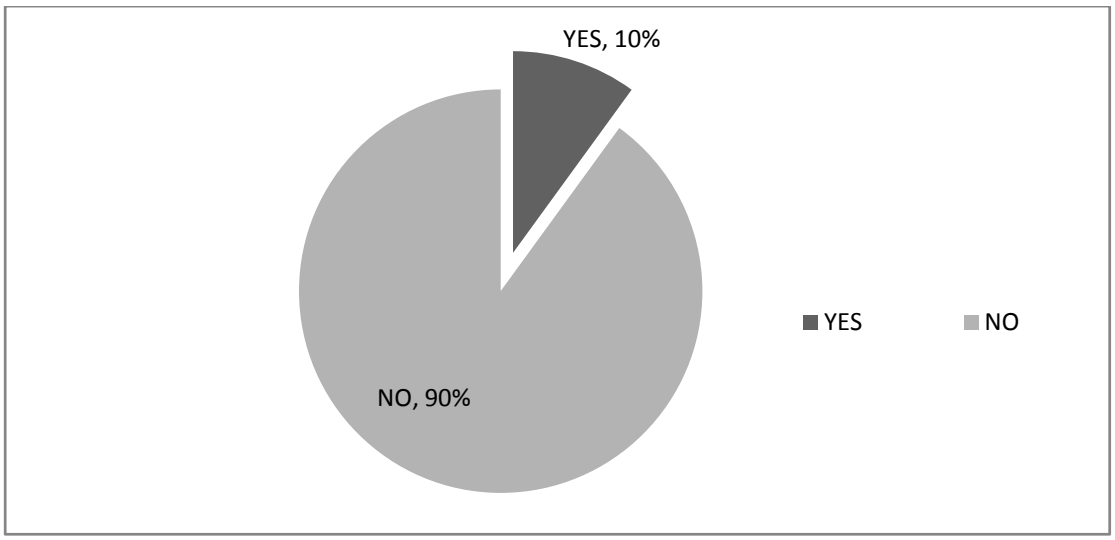
Chart 3 - Training elements suggested by Practitioners for Masons



4. **Level of awareness of construction workers about field specific specialized training institutions**

According to the survey data there are hardly 10% of construction workers who are aware about the training institutions of their field of interest. Almost 90% of workers are not at all aware about the specific training institutions, of their own field.

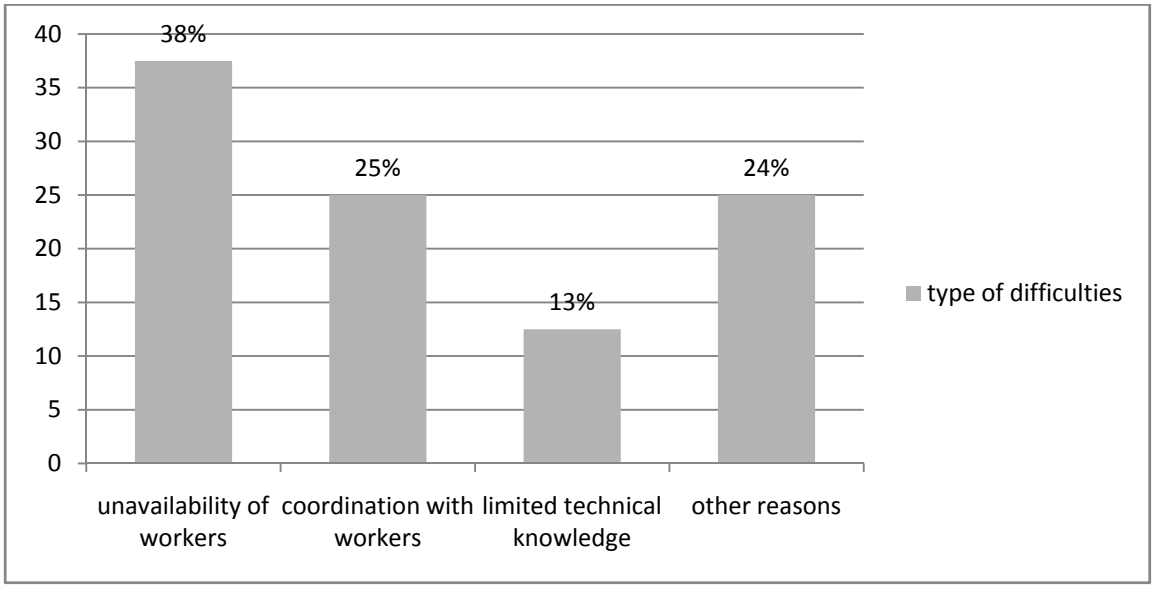
Chart 4 – Construction workers awareness about training institutions of their own field



5. **Contractors feedback on working with the construction workers**

It is coming out from the survey data that unavailability of the construction workers is a major issue (38%), apart from it the coordination with the local workers and outsiders (25%) and limited technical knowledge (13%) are the notable difficulties faced by the contractors.

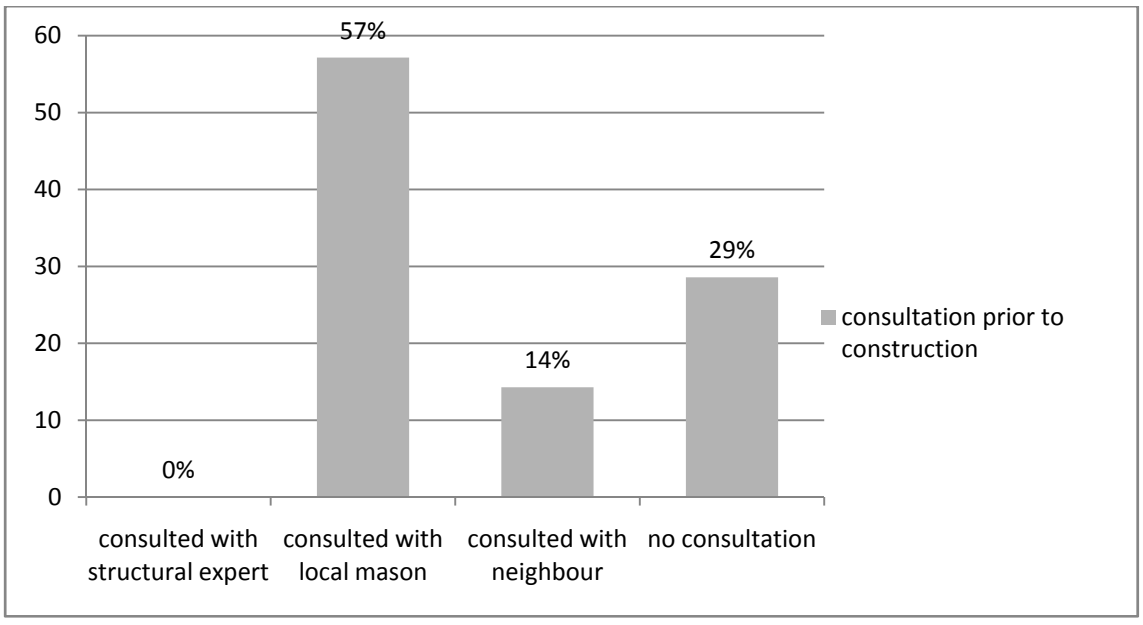
Chart 5 - Difficulties faced by Contractors while working with Construction Workers



6. **House owners views on consultation, prior to the construction**

The sample survey data reveals very shocking results pertaining to house owners response on the construction work. Surprisingly the house owners have not consulted with any of the structural expert of the region. Majority of them consulted the local fellows, masons and neighbours. However 29% accepted that there was no consultation done, prior to consultation.

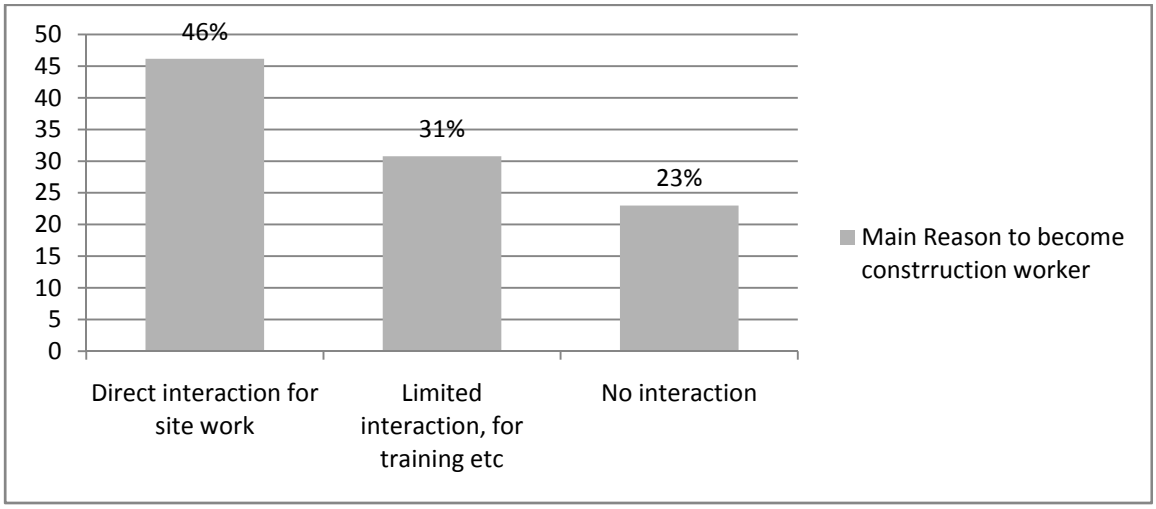
Chart 6 - House owners response on consultation, prior to construction work



7. **Practitioners interaction with construction workers**

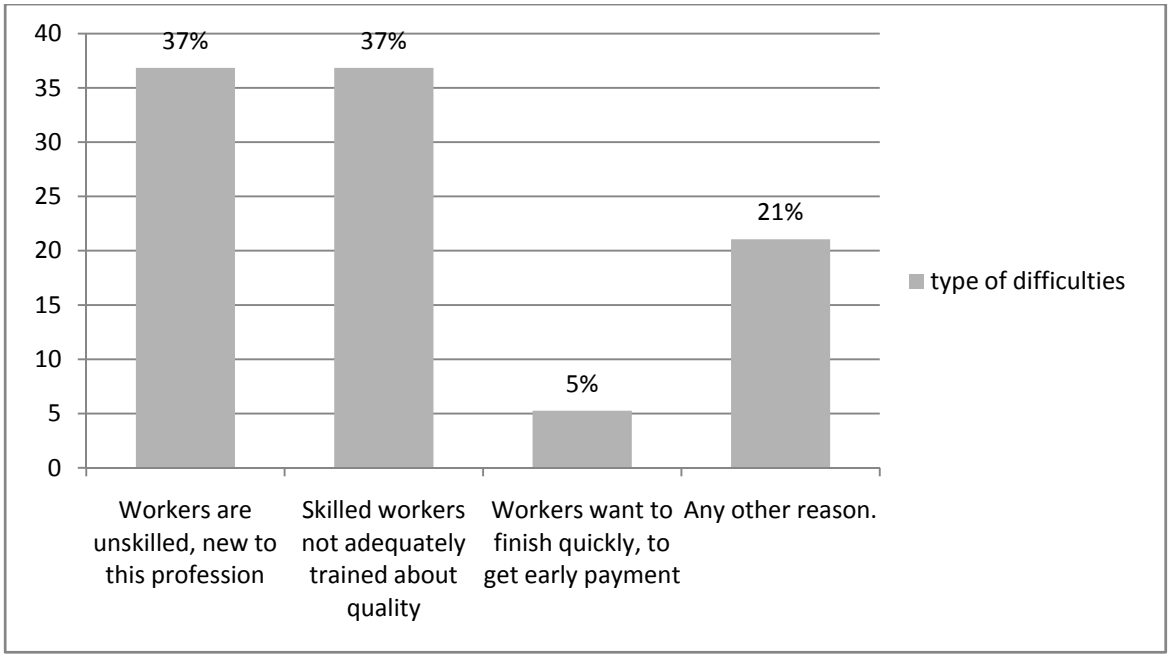
According to the survey results, in 46% cases there was direct involvement between workers and practitioners, for site work execution, which is comparatively low. There are notable cases (31%) of limited interactions, through trainings etc. However, in 23% cases, there was no interaction between the practitioners and construction workers, which is quite high, it needs to be low.

Chart 7 - Nature of interaction of Practitioners (Engineers and Architects) with construction workers



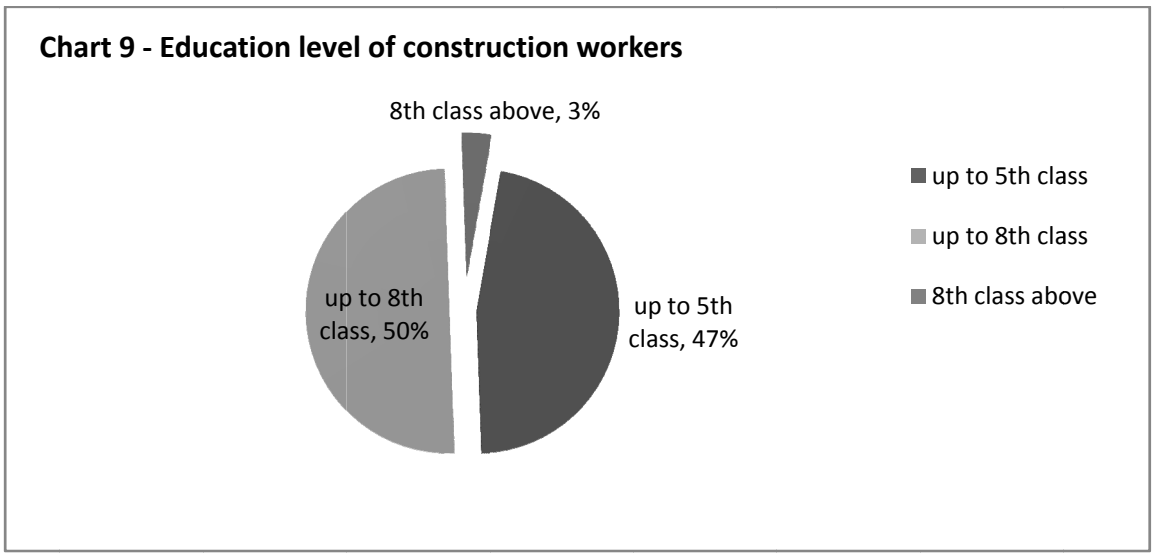
8. **Difficulties faced by the practitioners while dealing with construction workers:** The survey results highlighted the genuine problems faced by the Engineers and Architects, while dealing with the construction workers at site. In Himachal Pradesh, the majority of workers (37%) are unskilled and equal % of workers need to be trained further, especially on quality part. There are routine difficulties as well, which the practitioners normally face, while working at site.

Chart 8 - Difficulties faced while dealing with construction workers



9. **Education level**

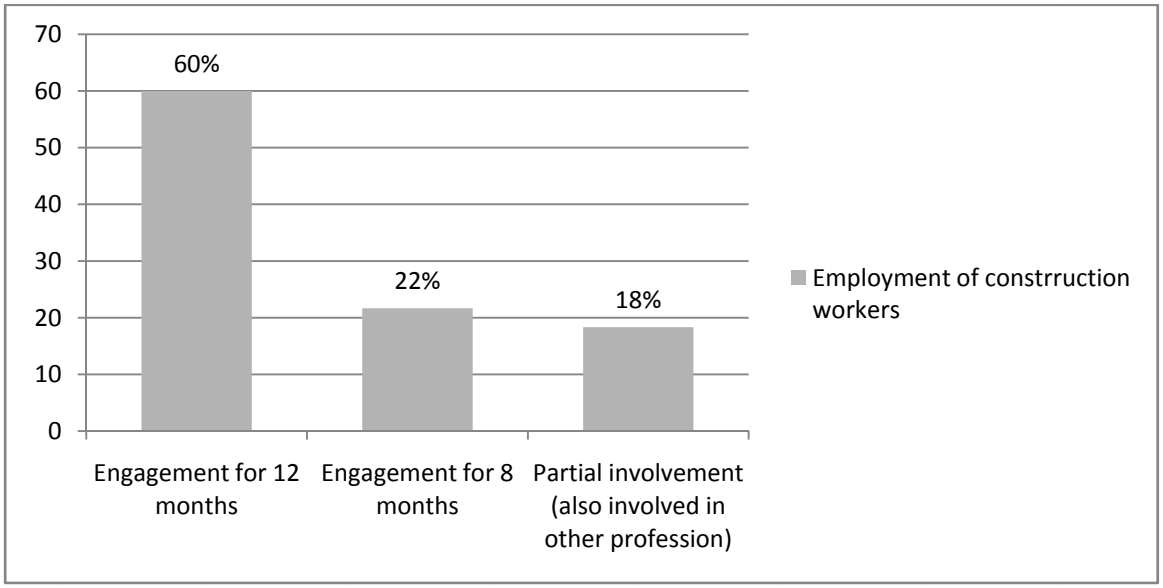
From survey results it is very clear that education level of construction workers, (representing mason, carpenter and wire binder, from hereafter) is very low. As only 3% workers have crossed the 8th class mark, whereas 97% workers could not able to reach to that level. Moreover, 47% could not able to cross the 5th class. This shows the high vulnerability of workers pertaining to education, which plays a very important role in understanding and capacity building of workers.



10. **Engagement of construction workers**

The survey data reveals that 60% workers are engaged as mason for the entire year (12 months). This is a good indicator of full involvement of worker as mason, and depicts that construction industry is booming in Himachal Pradesh, and there is demand of mason for construction work. Whereas, there are 40% of workers, who are partially engaged in construction, take a break and get involved in other profession. However there are 22% workers, who are engaged up to 8 months, which is also a good sign of engagement of construction workers.

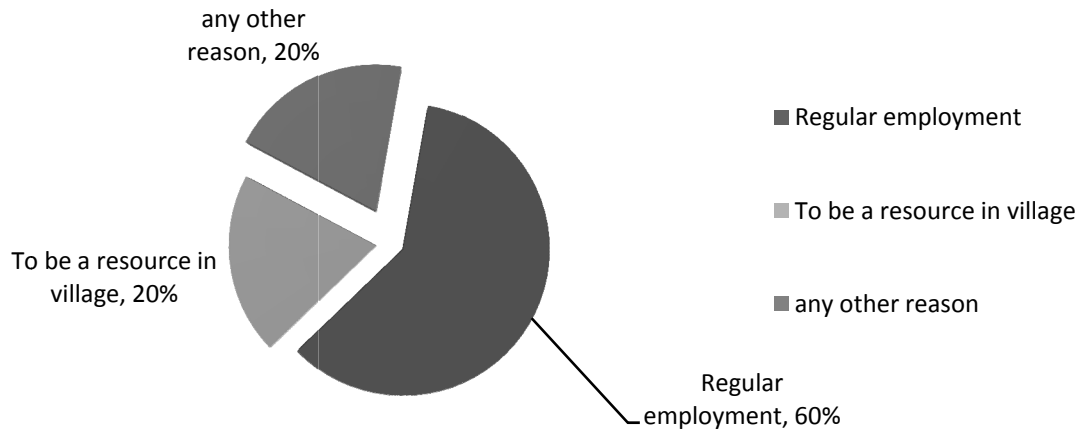
Chart 10 – Engagement of construction workers



11. **Prime cause for becoming the construction worker**

It is quite evident from the survey that 60% of the construction workers want to work, for the purpose of getting the regular employment. It shows that they are more concerned about their responsibilities. However 20% people want to become resource person in the respective villages. And remaining 20% have their own reasons for becoming the construction worker, as most of them have no other option left, therefore they tend to become a mason/carpenter/ wire binder.

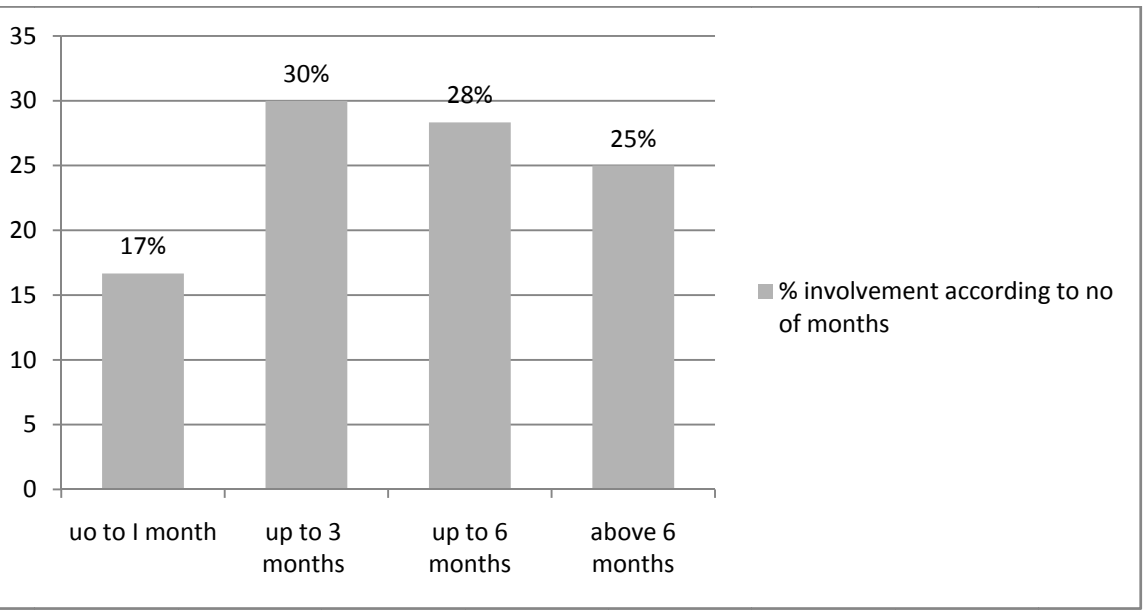
Chart 11 - Main Reason to become construction worker



12. **Length of current employment of construction workers**

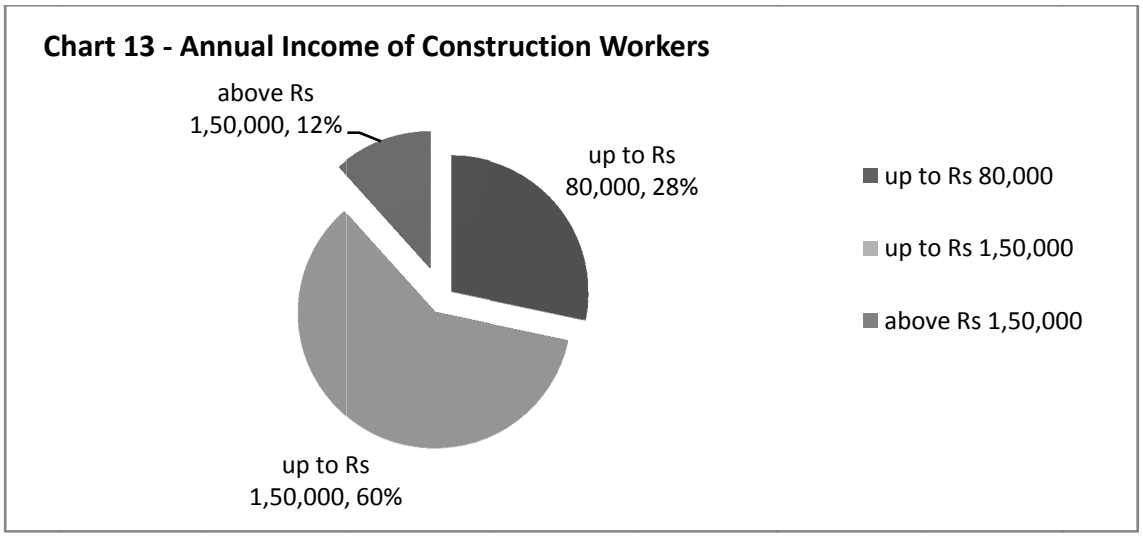
Collected survey data indicates that about 47% of construction workers have the employment only up to 3 months. And out of the remaining 53%, there are only 25% construction workers, who are able to retain the employment, after 6 months. These results also show the insecurity component amongst workers as there are 17% of workers, who have the employment only up to 1 month.

Chart 12 – Length of current employment of construction workers



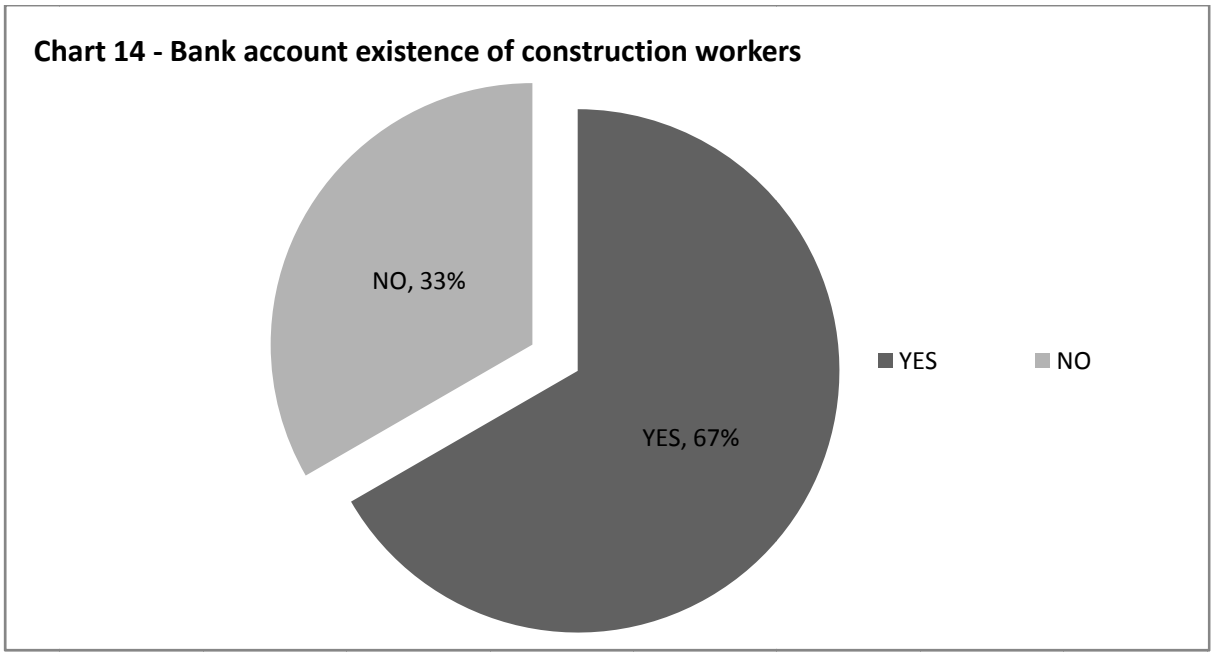
13. **Earnings of construction workers**

The survey data reveals that there are about 28% construction workers, who have the annual income more than Rs. 1.5 lakh (12,500 Rs per month). The other 72% have income less than this. Moreover 12% have the annual income less than Rs. 80,000 (Rs. 6,500 aprox per month). It shows the pathetic condition of construction workers.



14. **Existence of Bank Account**

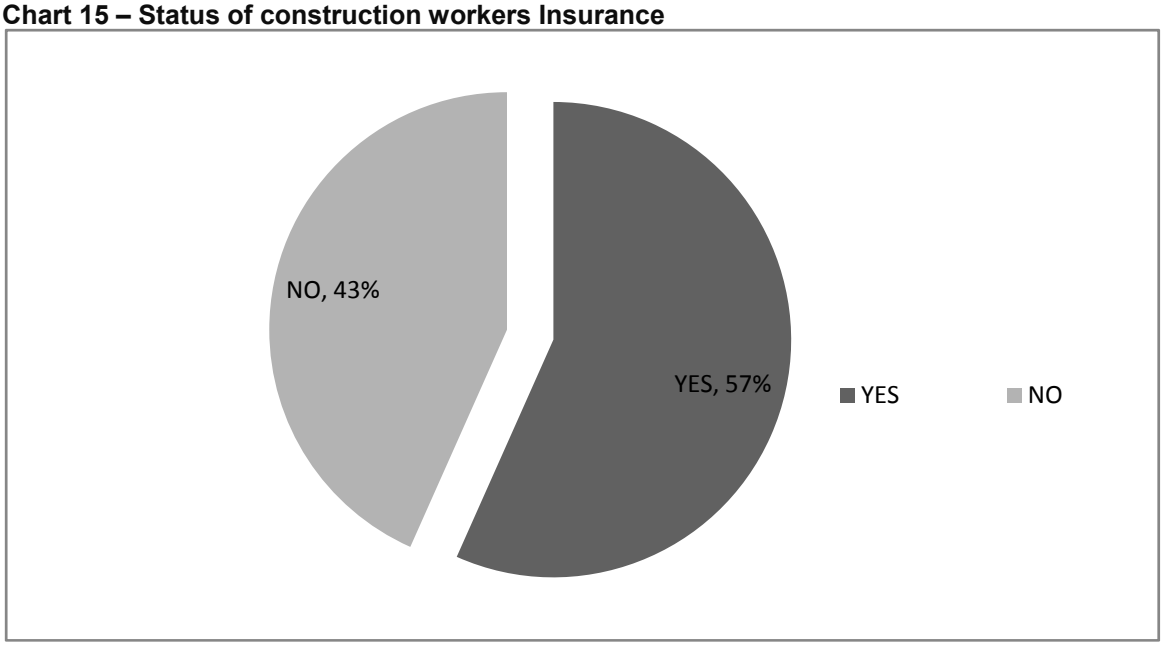
From the survey data it is quite clear that 2/3rd of construction workers have their own bank account (already exists). There are only 1/3rd of construction workers, who do not have the bank account at present.



15. **Insurance of construction workers**

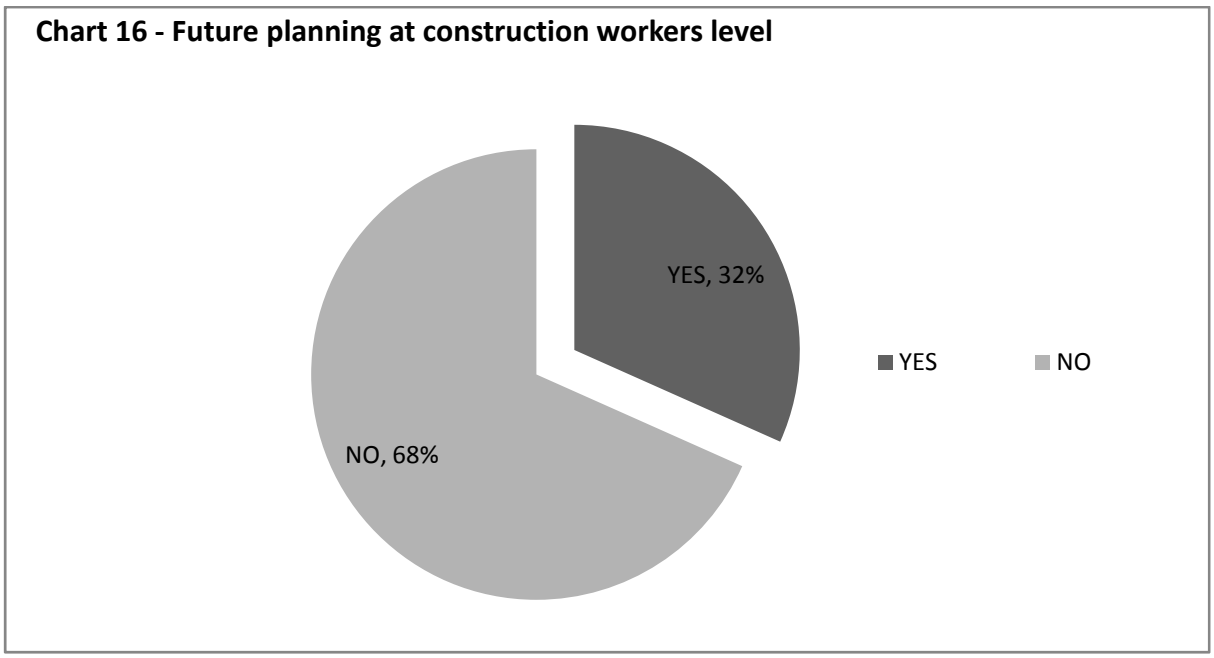
The collected data from survey reveals that 57% of construction workers are fully insured in terms of health and accidents. Whereas there are 43% of construction workers, who are not yet insured, they need to be insured, in order to cover the risk.

Chart 15 – Status of construction workers Insurance



16. **Future employment planning at construction workers level**

While asking about the future employment, 68% of construction workers have no such planning as such. Only 32 % construction workers had some plan in their mind, like they would like to become the contractor, carpenter, trained mason etc.



Based on the information collected by means of primary and secondary sources, the training needs analysis was done, mainly to identify the gaps between what is required for an effective strategy for capacity building and the currently existing levels of capacity.

The sample survey based needs assessment carried out in the above 16 parameters has provided the insights to assess the current levels of education and skills of masons, understand the pedagogy of proposed masons training and subsequent market linkages, for evolving the strategy for capacity building of masons, carpenters and wire binders, at the Panchayat level, for safe construction in Himachal Pradesh.

Other key challenges faced in working with Masons

- Masons had picked up their skills informally and were familiar only with traditional construction techniques. Training them in retrofitting techniques and convincing them of the need for the same was a challenge.
- The masons were unaware of seismic safety considerations like the need to provide small openings at sufficient distance from the corners. They were accustomed to providing large openings in walls to ensure thermal comfort in the building. The level of awareness of masons assumes importance in view of the fact that a large number of people in the state cannot afford the services of an engineer and depend on the advice of contractors and masons for construction.
- Most of the masons were seasonal workers and worked in the construction sector only for a part of the year. For the remaining part of the year they worked as agricultural labourers. This affected the quality of work since they often compromised on quality of work in order to complete the work prior to the harvesting season. Besides, they also lacked the desire to upgrade their skills due to the limited time spent doing masonry work. It is understood that agricultural work was taken up by masons to enhance their earnings, which were found to be meagre from construction activity.
- None of the labourers had any formal training in masonry techniques and learned their skills informally by working as construction workers from a young age. Thus the level of skills and knowledge varied.
- Most of the contractors, it was found, had graduated from being masons to contractors. However, finding a competent building contractor for construction of buildings was also a challenge since most of the local contractors were found to be engaged in road construction and retaining wall construction work. It was found to be a common practice, for contractors in the state, to work on a variety of projects. This affected their ability to execute the work since they lacked specialised knowledge of a particular type of construction.
- These masons also had very little safety orientation and a number of serious accidents occurred at site since common safety regulations were not followed.
- The workers were not insured and needed to depend on informal lines of credit in the aftermath of on-site accidents. High levels of risk involved in the work and lack of an insurance mechanism acted as a barrier to the entry of new workers to the sector.
- Constant supervision was required to ensure quality of work and use of proper construction techniques.

Emerging Needs:

The training needs analysis presents the following needs:

- On contents of a training course : The suggested contents by experts is more comprehensive, the expectations from existing masons however, is for specific skills which may help improve wages, but not necessarily lead to better quality of output.
- There is a clear recognition both among experts and those interviewed that training be carried out as far as possible on site as against a formal institutional framework. A fair mix of practical hands-on training and formal curriculum was felt. Existing low levels of basic education many be a major setback for any advanced training content.
- Certification and recognition is recommended. Current employers are eager on certification as a means of identifying good quality human resources. The workers view it as a prestige issue, experts feel standardized certification though not necessary is useful beyond the purpose for which the training was provided.
- Linkages with work, potential threat to livelihood while undertaking long duration training was felt across all stakeholders. Therefore, training with a robust system of apprenticeship may be useful.
- Further experts opined building a cadre of Master Trainers in the State to help develop a cascading system of training system across the state.
- Mobilization should ideally be done at Panchayat level, every Panchayat has select number of resident masons and construction workers.
- Uneven existing capacities among existing masons will be quite a challenge in bringing them under one standard course structure.

Chapter Five – Recommendations

The Study Team would make the following recommendations for developing capacity building programme for Masons, Carpenter and Wire Benders at State Level.

- A state level institution shall anchor the trainings and trained personnel in the state. This institution shall be pivotal in sharing of information about the ongoing projects and inventory of trained personnel.
- This institution shall not only be designing the outreach programmes but shall also maintain (GIS) database of the trained personnel. It shall provide real time information on skill inventories and their locations and shall act as one stop shop for potential employers.
- This institution may also be mandated to reach out the trained workers in the State on regular basis, informing them about updated list of projects, labour environments, policy changes, market information and updated technical information. And shall document feed back at annual basis.

(i) Approach : Forging public-private-people partnerships

- Capacity Building can best be achieved in a partnership mode. Government on its part, through its extensive network of technical training institutions in the State can provide Certification and a cadre of trained resource persons;
- The private sector and NGOs may be mandated to carry out the programme on-site in the functional area of the existing Government institutions. Such agencies may also be responsible for backward and forward linkages and conduct of training on an agreed upon syllabus, structure and style of teaching. These groups would also work for updation of content, contextualisation of trainings and adapting the revisions.
- Local Panchayats, and CBOs may be invited to support mobilization of eligible and willing youth for entry level courses. Existing workers too can be mobilized for availing training programmes that will help enhance their wage incomes. However, while mobilizing potential trainees, an initial screening exercise may be necessary.

(ii) Types of Training and Topics

The Study Team recommends three tier training strategy for the State :

1. **Entry Level**; long-term courses with apprenticeship, for eligible youth in villages and towns, existing construction labourers who may be interested in learning masonry skills.

   Topics may include among others: Basic rules about good quality construction, Do's & Don'ts, Achieving proficiency in communication, Reading building drawings, Correct way of using Portland Cement, Correct way of using steel, Features and options on walling and roofing, Site development works site selection and preparation, lay outs for building construction, importance of various construction materials and proper ways to use them for construction works, considering all the safety aspects.

   Eligibility: Freshers or Recommended by Punchayats/CBOs, 1-2 years experience of sitework

2. **Refresher Level**; short-term courses that equips existing masons to improve their existing skills, rectify common practice related mistakes, improve quality of their existing work.

Topics may include among others : Indian Standards and related guidelines, Impact of Disasters, Hazard Resisting Features, , Good practices of the region etc.

Eligibility: 4-5 years experience of mason work on site or 2 years after entry level certification

3**. Advanced Level**; short-term courses that may equip masons in enterprise related skills, which would include management, basic estimation of mandays, and ability to quote for projects and build small teams, reading project BoQs, Estimates, information about new technologies and materials, how to use latest equipment for construction works etc.

Eligibility: 10-12 years experience of mason work and 5 years after Certification of level 2.

(iii) Instruction style

- Training on-site has maximum impact. Thus decentralized training (especially for Refresher and Advanced level courses) is recommended. Training may be conducted at Block or GP level depending on available numbers.
- Class Room training for the entry level must be interactive and shall be accompanied by illustrative posters, videos, down-scaled working models to explain abstract things like building behaviour etc. Such methods have been found to be very useful. These provide opportunities for hands-on training as mock-ups, and can be designed in a way so that these can be used repeatedly.
- Field based exposure visits, monitoring and feedback will provide inputs for problem solving approaches that may be undertaken in training sessions.
- Simple pictorial booklets may be produced as field-guides for trainees
- Duration of courses specially for Refresher and Advanced level courses, must be short (upto 7 days)
- Timing of the training programme should be in accordance with the availability of construction workers so they do not lose their daily wages during the period of training.

(iv) Certification

While no standard certification exists in the country, a State Level certification system may be evolved. The certification system should be inclusive to make it accessible for a vast majority of masons who are illiterate, or have less education.

The Certification system should promote continuous learning. In a sense, it should have a validity period, which is renewable when the mason undertakes a refresher course. Likewise, the certification system should enable masons to reach master mason level in incremental steps.

A state level agency will have to be identified. The possibility of Department of Technical Education Vocational and Industrial Training at Sundernagar, Himachal Pradesh can be considered.

(v) Other Enabling Factors

In addition to these, several factors will ensure success of such programme. The following recommendations may be considered in preparing the final strategy:

- Centrally sponsored schemes such as MNREGA and SSA may be leveraged. This has been successfully piloted in the States of Uttar Pradesh. Such programmes provide opportunities for on-site work and training of unemployed rural youth, mobilized through the Panchayats. With necessary support of resource institutions on training infrastructure, the programmes will be able to achieve long term sustainable benefits to local communities.

- Curriculum design will be an important component of a programme. It will need to relate to the existing market demand, without compromising on quality issues and national building code provisions. In addition to regular subject issues, works need to be inculcated on aspects of safety at work place, code of conduct, hygiene, maintenance of equipments/ toolkits etc.

- Once the curriculum is prepared, trainings should be conducted for carefully selected trainers. These trainers should go through a thorough Training of Trainers' course. A technical guideline and a field guide would help in conduct of trainings in the field.

- Compensating masons on actual of loss of wage income during the training period is a tricky issue. The Study Team has received varying feedback on the same. While most have given away stipends to trainees, the amounts are usually lower than the regular daily wage amounts. These stipends are released only towards the end of the training course to ensure trainees undertake the full training course. This requirement, however, does not apply to entry level trainees.

- To address a potential disincentive to undertake training, the State Government may through its regular media and other forums disseminate benefits of good construction practices, thereby fuelling a demand for good quality workmanship. At one point, the Government of Gujarat, considered making it compulsory for all government sponsored construction tenders to have a fixed minimum percentage of trained and State certified masons in the contractors' work force.

- Promotion of certified construction workers is the main essence of success of any construction worker programme. It is very necessary that State government make mechanism to encourage contractors and construction companies to hire certified construction workers or send construction workers for such kind of training programmes.

Annexure – 1 Polytechnics in Himachal Pradesh

Government. Polytechnics					
Sr No	**Name Of Institution**	**Location**	***Year of Establishment***	**Website**	**Concerned Course Conducted**
1	Govt. Polytechnic Sundernagar, Distt. Mandi HP	Sunder Nagar	*1959*	www.gpcsundernagar.org *:*	Civil Engineering, , Architecture Assistantship
2	Govt. Polytechnic Hamirpur, Distt. Hamirpur(HP)	Hamirpur	*1963*	www.gphamir.com	Civil Engineering
3	Govt. Polytechnic Rohroo, Distt. Shimla(HP)	Rohru, Shimla	*1963*	www.gprohru.com	
4	Govt. Polytechnic for Women Kandaghat, Distt. Solan (HP)	KandaghatSolan	*1984*	www.gpcwkandaghat.nic.in	
5	Govt. B.R. Ambedkar Polytechnic Ambota, Distt. Una(HP)	Amb, Una	*1995*		Civil Engineering, , Architecture Assistantship
6	Govt. Polytechnic Kangra, Distt Kangra(HP)	Kangra	*1992*	www.gpkangra.com	
7	Govt. Millennium Polytechnic Chamba (HP)	Chamba	*2007*		
8	Govt. Polytechnic Banikhet, Chamba(HP)	Banikhet, Chmba	*2007*		Civil Engineering
9	Govt. Polytechnic Talwar (Jaisinghpur), Kangra(HP)	Jaisinghpur, Kangra	*2008*		Civil Engineering
10	Atal Bihari Vajpaee, Govt. Instt. of Engg. & Technology (Polytechnic) Pragatinagar		*2011*		

Private Polytechnics					
Sr. No	**Name of Institution**	**Location**	***Year of Establishment***	**Website**	**Concerned Course Conducted**
1	Green Hills Polytechnic College Kumarhatti-Nahan Road, Gandhigram, Distt. Solan(H.P.)	Solan,	*2007*		
2	MIT Polytechnic Bani, Distt. Hamirpur (H.P.)	Bijar, Hamirpur	*2008*	www.mithmr.com	Civil Engineering
3	Himalyan Polytechnic Sadhura Road, Kala Amb, Distt. Sirmour (H.P.)	Amb, Una	*2008*	www.hgpi.org	Civil Engineering
4	M.G. Polytechnic College Badhu, Distt. Mandi	Mandi	*2008*	www.mginstitute.org	
5	Dev Bhumi Polytechnic, Vill-Chandpur, Near Lalehari, Tehsil Hroli, Distt. Una	Haroli, Una	*2009*	www.devbhumyeducations.org	Civil Engineering
6	K.C.Polytechnic, Pandoga Uparela , Tehsil & Distt. Una	Una	*2009*	www.kcinstitutes.com	
7	A.I.T. Polytechnic Nalagarh, Distt. Solan H.P	Nalagarh, Solan	*2009*		Civil Engineering
8	Natraj Polytechnic, Village Sainthal P.O. Rajwari Near Hateshwari Mata Mandir, Distt. Mandi		*2009*		Civil Engineering
9	Minerva, Polytechnic, Vill- Changrara, PO-Bhapoo, Indora, Distt. Kangra	Indrora, Kangra	*2009*	www.msedu.co.in	Civil Engineering
10	MG Polytechnic-II, Vill. Bulha Tipper Teh. Barsar Distt. Hamirpur	Bijar, Hamirpur	*2009*	www.mgiet.org	Civil Engineering
11	Devasya (Women) Polytechnic, Vill-Bazuri, PO, Tehsil & Distt. Hamirpur	Hamirpur	*2009*		Architecture Assistantship
12	Gautam Girls Polytechnic Ward No. 10, Hamirpur	Hamirpur	*2009*	www.gautamgirlscollege.com	Civil Engineering, Architecture Assistantship
13	Dreamz Polytechnic Khilra, P.O. Meramasit, Tehsil Sundernagar, Distt. Mandi	Sunder agar, Mandi	*2009*		Civil Engineering

14	Pt. Gauri Shankar Memorial Polytechnic, Devnagar, Arki, Distt. Solan (H.P.)	Arki, Solan	*2009*		Civil Engineering
15	SIRDA (Women) Polytechnic Vill. Troat, P.O Kanaid Sundernagar, H.P.	Sundernagar	*2009*		Civil Engineering
16	Shivalik Polytechnic VPO. Badhera, Tehsil Haroli, Distt. Una	Haroli ,Una	*2009*		Civil Engineering
17	Kanta Polytechnic Chalwara Tehsil Jawali, Distt. Kangra, H.P.	Jawali, Kangra	*2010*		
18	Lal Gee Polytechnic Village Malwana, Tehsil Sadar, Distt. Mandi	Sadar, Mandi	*2010*		Civil Engineering
19	L.R. Polytechnic Jabli Kyar, Tehsil Ochghat, Distt. Solan, H.P.	Solan	*2010*		Civil Engineering
20	Shanti Niketan College of Pharmacy, Ratti, Distt. Mandi(H.P.)	Mandi	*2006*		

Annexure – 2 Industrial Training Institute in Himachal Pradesh

Government Industrial Training Institute in Himachal Pradesh				
Sr. No	**Name Location of Institution**	**Year of Estd**	**Location**	**Concerned Course Conducted**
1	ITI Bilaspur, Bilaspur(HP)	1964	Sadar, Bilaspur	Carpenter,
2	ITI Swarghat. Distt. Bilaspur(HP)	2007	Swarghat,Bilaspur	
3	ITI Chamba. Distt. Chamba(HP)	1964	Chamba	Draughtsman (Civil), Carpenter, Surveyor, Wireman
4	ITI Garnota (Dhalliyat) Chamba(HP)	2007	Dhliyara, Chamba	
5	ITI Lachori (Banikhat) Chamba(HP)	2007	Banikhet, Chamba	
6	ITI at Koti(Tissa) Distt. Chamba.	2007	Tissa, Chamba	
7	ITI Bharmour Distt. Chamba.		Bharmaur, Chamba	
8	ITI Naduan (at Rail) Distt. Hamirpur	1968	Nadoun, Hamirpur	Carpenter
9	ITI Bhoranj Distt. Hamirpur		Bhoranj, Hamirpur	
10	ITI Bani Hamirpur		Bijar, Hamirpur	
11	ITI Hamirpur, Distt Hamirpur		Hamirpur	
12	ITI Lambloo, Distt. Hamirpur H.P.		Hamirpur	
13	ITI Sujanpur Tihra Distt. Hamirpur. H.P. Y.	2007	Sujanpur Tihra, Kangra	
14	ITI Shahpur, Distt. Kangra	1963	Sahpur, Kangra	Carpenter, Draughtsman Civil, Surveyor
15	ITI Nurpur,Distt Kangra	1997	Nurpur, Kangra	
16	ITI Nehranpukhar, Distt. Kangra	1975		Welder,
17	ITI Saliana, Distt. Kangra			
18	ITI Dhameta, Distt. Kangra			
19	ITI Dharamshala Distt. Kangra	1957	Dharamshala	
20	ITI Palampur Distt. Kangra	1964	Palampur, Kangra	
21	ITI Jawali Distt. Kangra		Jawali, Kangra	
22	ITI Baroh Distt. Kangra.	2007		
23	ITI Lahru at Balakrupi, Distt. Kangra. HP	2007		
24	ITI GarhJamula , Distt. Kangra.	2007		
25	ITI Gangath Distt. Kangra.		Gangath, Kangra	Welder
26	ITI Dadasiba (Jaswan) Distt. Kangra	2007	Jaswan, Kangra	

27	ITI Reckong Peo Distt Kinnour.		Peo, Kinnaur	Welder,
28	ITI Shamshi Distt. Kullu.		Samshi, Kullu	Draughtsman (Civil),
29	ITI Sainj, Distt. Kullu		Sainj, Kullu	
30	ITI Nirmand, Distt. Kullu H.P.		Nirmand, Kullu	
31	ITI Udaipur Distt. Lahul Sapiti H.P		Udaypur, Lahul Sapiti	
32	ITI Rongtong, Distt. Lauhal & Spiti HP		Sapiti	
33	ITI Mandi	1941	Sadar, Mandi	Carpenter, Welder,
34	ITI Joginder Nagar, Distt.Mandi		Jogindernagar, Mandi	.
35	ITI Paplog, Distt.Mandi			
36	ITI Bagsaid, Distt.Mandi			Welder.
37	ITI Karsog, Distt.Mandi		Karsog, Mandi	
38	ITI (PH) Sundernagar Distt.Mandi	1959	Sundernagar, Mandi	Draughtsman (Civil)
39	ITI Thalaut, Distt. Mandi			
40	ITI Batail, Distt. Mandi. H.P			Welder
41	ITI Chachiot, Distt. Mandi.H.P	2007		
42	ITI Solan, Distt. Solan.H.P	1959	Solan	Draughtsman Civil, Carpenter, Welder
43	ITI Nalagarh Distt. Solan	1959	Nalagarh, Solan	Carpenter, Welder
44	ITI Deegal, Distt. Solan			
45	ITI Kasauli, Distt. Solan	1960	Kasouli, Solan	
46	ITI Arki, Distt. Solan	2007	Arki, Solan	
47	ITI Shimla	1962	Shimla, Chaura Madain	Draughtsman (Civil), Fitter, Surveyor, Welder, Wireman
48	ITI Jubbal Distt. Shimla	1980	Jubbal,Shimla	Welder
49	TI Rampur, Distt. Shimla	1983	Rampur, Shimla	
50	ITI Kumarsain, Distt. Shimla		Narkanda, Shimla	
51	ITI Chopal Distt Shimla		Chopal, Shimla	
52	ITI Chirgaon Distt. Shimla H.P	2007	Chirgaon, Shimla	
53	ITI Theog, Distt. Shimla H.P.	2007	Theog, Shimla	
54	ITI Junga, Distt. Shimla	2007	Rural Shimla	
55	ITI Nahan, Distt Sirmour	1963	Nahan, Sirmaur	Draughtsman (Civil), Welder,
56	ITI Paonta Sahib, Distt. Sirmour	1964	Paonta, Sirmaur	,Carpenter
57	ITI Rajgarh, Distt.		Rajgarh, Sirmaur	

	Sirmour			
58	ITI Shillai, Distt. Sirmour		Shillai, Sirmaur	
59	ITI Bogdhar, Distt. Sirmour H.P.			
60	ITI Kaffota, (Shillai), Distt. Sirmour			
61	ITI Sarahan, Distt. Sirmour HP			
62	ITI Una	1967	Una	Welder, Carpenter
63	ITI Bangana Distt. Una	2002	Bangana	
64	ITI Santoshgarh, Distt. Una, H.P.	2007	Santoshgarh	
65	ITI Chintpurni, Distt. Una		Chintpurni, Una	
66	ITI Bhatrota, Distt. Mandi, HP			
67	ITI Tikkar, Distt. Shimla, HP			
68	ITI Sandhole, Distt. Mandi, H.P.		Sandhole, Mandi	
69	ITI Ghumarwin, Distt. Bilaspur	2010	Gumarwin, Bilaspur	
70	ITI Sarahan,Distt. Shimla		Rampur, Shimla	
71	ITI Santoshgarh, Distt. Una			
72	ITI Pragatinagar, Distt. Shimla			
73	ITI Dalash, Distt. Kullu		Dalash, Kullu	
74	ITI Khundian, Distt Kangra			
75	Motor Driving & Heavy Earth Moving School Amb at Una			

Private Industrial Training Institutes in Himachal Pradesh

Sr. No	Name Location of Institution	Location	Course Conducted
1	Jay Pee ITI(Pvt), Samirpur Hamirpur	Hamirpur	
2	Jhyotsana ITI(Pvt), Loharian, Hamirpur	Hamirpur	
3	S.D.S.J. ITI Barog Solan.		Draftsman(Civil),
4	Shiksha Bharti ITI(Pvt), Kotla Khurd, Una		Welder
5	Bhagwan Parshuram ITI(Pvt), Sangrah, District Sirmour		Draughtsman Civil
6	Rainbow ITINagrota Bagwan, Distt. Kangra, HP	Nagrotabagwan, Kangra	Welder
7	Hariom ITIVPO Deegal, Teh. Nalagarh, Distt.Solan, HP	Nalagarh, Solan	Welding

Annexure – 3 Engineering Colleges in Himachal Pradesh

Sr. No	Name and Address of Institution	Category	Location	Year of Estd	Website	Concerned Course Conducted
1	Jawhar Lal Nehru Govt. Engineering College Sundernagar, Distt. Mandi Himachal Pradesh	Govt	Sundernagar	2006		Civil Engineering
2	IITT College of Engineering Kala Amb Distt. Sirmour H.P. Estd	Private	Amb	1997	http://www.iittindia.com	
3	Green Hills Engineering College Gandhi Gram, Kumarhatti Distt. Solan(H.P.)	Private	Solan	2003	http://www.ghec.in	Civil Engineering
4	M.G. Institute of Engineering and Technology Badhoo, Tehsil Chachyot, Distt. Mandi (H.P.)	Private	Near Mandi	2007	www.mg-group.in	Civil Engineering
5	LR Institute of Engineering & Technology, Vill- Jabli-Kyar, PO-Ochhghat, Solan (H.P.)	Private	Solan	2008	http://www.iriet.org	Civil Engineering
6	T.R. Abhilashi Memorial Institute of Engineering and Technology, Village Tanda P.O. Balt Tehsil Sadar, Distt. Mandi H.P	Private	Mandi	2009	http://www.abhilashi-edu.com	Civil Engineering
7	Shiva Institute of Engineering & Technology Vill. Luhnoo Kanatain, P.O. Chandpur, Tehsil & Distt. Bilaspur H.P	Private	Sadar Bilaspur	2009	http://www.siethp.ac.in	Civil Engineering
8	SIRDA Institute of Engineering & Emerging Technology for Women, Naulakha, P.O. Kanaid, Tehsil Sundernagar, Distt. Mandi H.P	Private	Sundernagar	2009		Civil Engineering
9	MIT College of Engineering & Management Village Ganoh Rajputan, P.O. Bani, Tehsil Barsar, Distt. Hamirpur.	Private	Bijar, Hamirpur	2009	www.mithmr.com	Civil Engineering
10	K.C. Institute of Engineering and Technology, VPO. Pandoga Uperla, Tehsil & Distt. Una(H.P.)	Private	Una		www.kcinstitute.in	Civil Engineering
11	SAI Ram Educational Trust Group of Institutions (B.Tech), Bulhatipper, P.O. Tehsil Barsar, Distt. Hamirpur(H.P.)	Private	Badsar, Hamirpur			Civil Engineering
12	Bells Institute of Management & Technology, Knowledge City, Mehli, Shimla-9,	Private	Rural Shimla		www.bells.ac.in	Civil Engineering
13	Himachal Institute of Engg. & Technology, Shahpur Kangra(HP)	Private	Sahpur, Kangra			Civil Engineering
14	Abhilashi Group of Institutions, Chail Chowk(Chachyot), Distt. Mandi	Private	Chail, Solan			Civil Engineering
15	Dev Bhoomi Group of Institute, Vill Chandpur, Tehsil Haroli, Distt Una(HP)	Private	Haroli, Una			Civil Engineering
16	Vaishno College of Engineering, Vill. Thapkour, Teh. Nurpur, Distt. Kangra(HP)	Private	Nurpur, Kangra			Civil Engineering
17	MIT College of Engineering & Management Village Ganoh Rajputan, P.O. Bani, Tehsil Barsar, Distt. Hamirpur (HP)	Private	Barsar, Hamirpur	2009	www.mithmr.com	Civil Engineering

Table 1 - Mapping of National Institutions w.r.t. Safe Construction

National Level

Sr. No.	Name of Institution	Category (Government / Private/ Union/ NGO, SHGs)*	Location of HQ (Head Quarter) and Branch Offices	Mandate of the Institution	Organizational capacity - No of qualified staff - No of support staff	Relevance to Masons Training Training provisions Certification Absorption and use Create Market Linkages
1.	SMA (SEEDS Mason Association)	Private	Gujarat	Train masons to ensure quality construction and create safe living conditions	3 Engineers, 25 Master trainers	- Training provisions
2.	NCPDP	NGO	Ahemdabad, Gujarat Latur, Maharashtra Uri, J&K, Chamoli, Uttarakhand	Promote sustainable & viable technologies to help people reduce their vulnerabilities against disasters.	3 Engineers, and 2 Support Staff (1 Master Trainer, I Social Mobilizer)	- Training provisions, development of modules
3.	BMTPC	Govt.	New Delhi - HQ	Promote disaster resilient building material, technologies for sustainable development of housing	6 Engineers	- Training, development of module, IEC material design - Market linkages
4.	Habitat Technology Group	NGO	Scale - National level, Branch Offices	Promoters of cost effective, eco friendly and sustainable	Trained staff of 400 experts including	- Faculty, training provisions, development of modules,

			in all 14 dists of Kerala, HQ Thiruvanthapuram	building technologies. Specializing in disaster management techniques and safer construction practices. Conducting educational and training programs in the above disciplines, at Int. and national level.	Engrs, Architects, and Support staff.	- Preparation of syllabus, hands on training, documentation, hand outs, - Certifications, evaluations etc
5.	HSMI	Govt.	New Delhi – HQ	Training, research and consultancy in housing, urban development and poverty alleviation	Group of Engrs, Architects, and Support staff	- On site Training provisions
6.	GSDMA	Govt.	Ahmedabad	Go beyond reconstruction, make Gujarat economically vibrant and industrially competitive with improved standards of living and with a capacity to mitigate & manage future disasters.	-	- Certification
7.	Ambuja Cement Foundation	Private	Dahod, Gujarat, Daldaghat, Solan, Himachal Pradesh	Energize, involve and enable communities to realize their potential	-	- Training provisions - Market linkages
8.	L & T	Private	Chennai, Mumbai, Delhi, Kolkata, Ahmedabad, Hyderabad, Bangalore	Disseminate knowledge, skills and practices thro' recognized systems of training, testing and Certification, to validate	250 no. of master trainers, including the support staff	- Training provisions - Certification - Absorption and use - Market linkages

				competency levels.		
9.	JK	Private	Agra, UP Bhuj, Gujarat	Upgrading skills for constructing safe structures	-	- Training provisions - Certification - Absorption and use
10.	J&K Govt Technical Education Deptt.	Govt	Jammu & Kashmir	Ensure steady flow of skilled workers in different trades to raise industrial production by systematic training, in order to reduce unemployment among the educated youth by providing them employable training.	Good enough no. of nodal officers	- Training provisions - Certification - Market linkages
11.	CIDC	Govt	HQ – New Delhi, Branches in 17 states of India	Upgrade skills of working construction professionals through structured training , best practices and recent trends	Minimum 100 master trainers at a time available	- Training provisions - Certification - Market linkages
12.	Hunnarshala	NGO	HQ – Bhuj, Gujarat Branch offices in Bihar, Rajasthan	To capacitate people for habitat reconstruction	-	- Training provisions - Certification - Market linkages - Absorption and usage

Table 2 - Mapping of Himachal Pradesh Institutions w.r.t. Construction

State - Himachal Pradesh

Sr. No.	Name of Institution	Category (Government/ Private/ Union/ NGO, SHGs)*	Location of HQ (Head Quarter) and Branch Offices	Organizational capacity - No of qualified staff - No of support staff	Relevance to Masons Training Training provisions Absorption and use Create Market Linkages
1.	Technical Education	Government Department	*Vocational & Industrial Training, Sunder agar, Himachal Pradesh-1744 01*	-	Training Provisions, Syllabus development
2.	Irrigation & Public Health	Govt Department	SDA Complex Kasumti, Shimla - 171009	1901	Absorption and Use
3.	State Administrative Training Institute (HIPA)	Govt Department	Fairlawn, Dhalli, Shimla17112	_	Training provisions
4.	Urban Development	Govt Department	Director (UD)Torland, Shimla-171002	54	Absorption and Use
5.	Department of Town Country Planning	Govt Department	Directorate of TCP, Nigam Vihar, Shimla-171002	71	Absorption and Use
6	HP Housing and Urban Development Authority	Govt Department	HIMUDA, SDA Complex Kasumpti	93	Absorption and Use
7.	Rural Development & Panchyati Raj	Govt Department	Rural Development Department 27 SDA Complex, Kasumpti Shimla-171009	210	Absorption and Use

8.	Public Works Department	Govt Department	Engineer-in-Chief, HP.PWD, Shimla-1	6010	Absorption and Use Training provisions
9.	Himachal Pradesh Road & Other Infrastructural Development	Govt Corporation	Managing Director, HPRIDC Ltd., New Himrus Building, Circular Road Shimla		Absorption and Use
10.	HP State Electricity Board	Govt Department	Chief Engineer (S.O)Vidyut Bhawan Shimla-171004, India.	492	Absorption and Use
11	Sarv Siksha Abhiyan	Wing of Education, supported by Govt.	State Project Office, SSA, Lal Pani Shimla	61	Absorption and Use
12	Satluj Janl Vidut Nigam	Power Project Undertaken by Govt	BCS, Shimla		Absorption and Use
13	National Hydroelectric Project Corporation	Govt Corporation	Shimla City		Absorption and Use
14	Associate Cement Company	Cement Company	Barmana, Bilaspur		Absorption and Use Training provisions Market linkages
15	Ambuja Cement Company	Cement Company	Daldaghat, Solan, HP		Absorption and Use Training provisions Market linkages
16	State Council, Deptt of Science Technology and Environment	Govt Department	Block-34, SDA Complex Kasumpti		Training provisions

17	HP BSNL	Telecommunication, Govt Deptt	Civil Wnng, HPBSNL, New Shimla, Sector-4		Absorption and Use
18	Sai Engineering Foundation	NGO	Sector-4, New Shimla-171009		Absorption and Use
19	Mason, Car painter and wire Binder Unions	Union	Shimla City		Market linkages
20	Private Contractors Union	Union	Shimla City		Market linkages

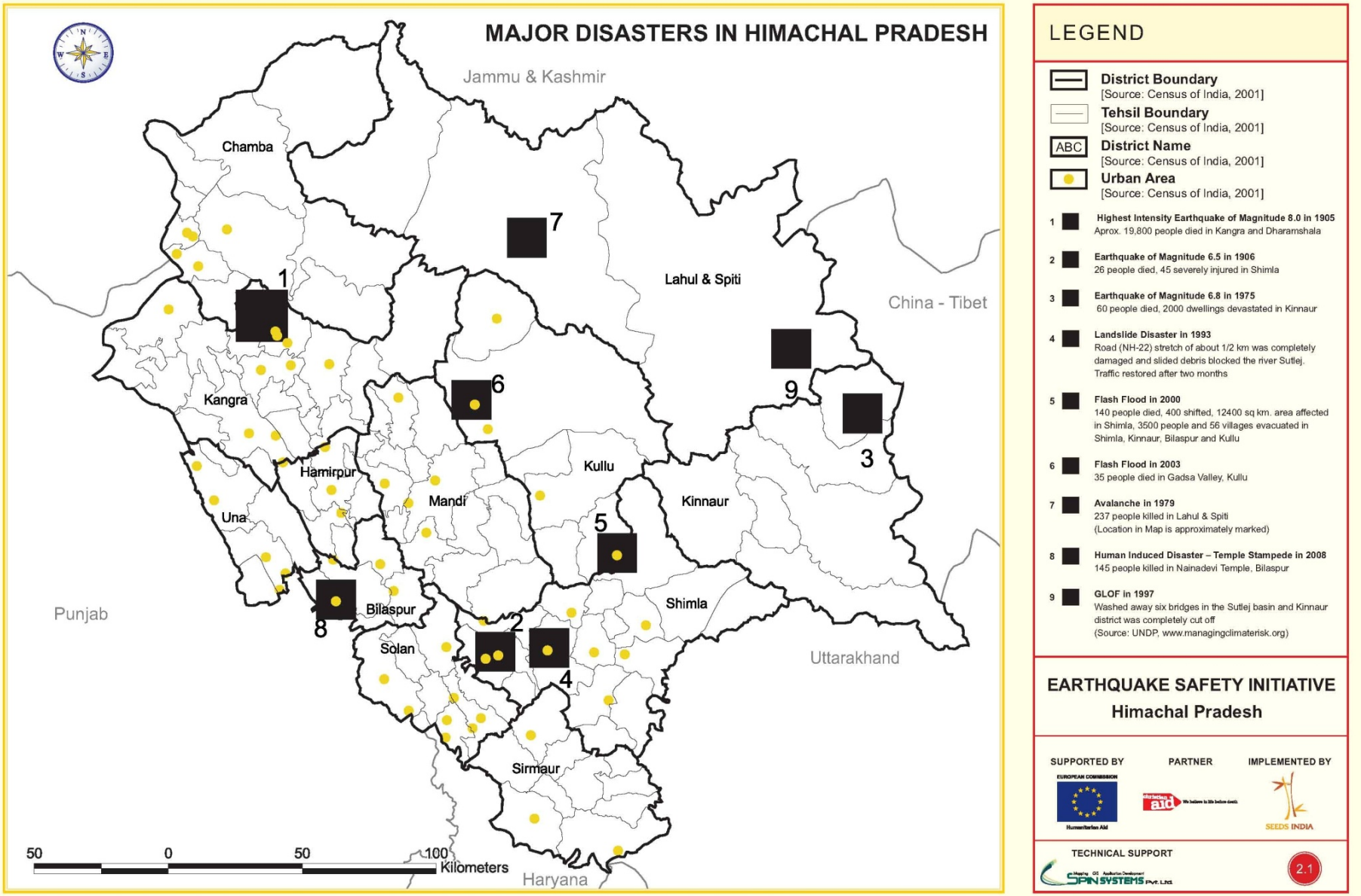
* Category indicates type of the institution like Govt Deptts, Private agencies (including Corporate, Builders/ Contractors), Trade Union, NGO, SHGs etc.

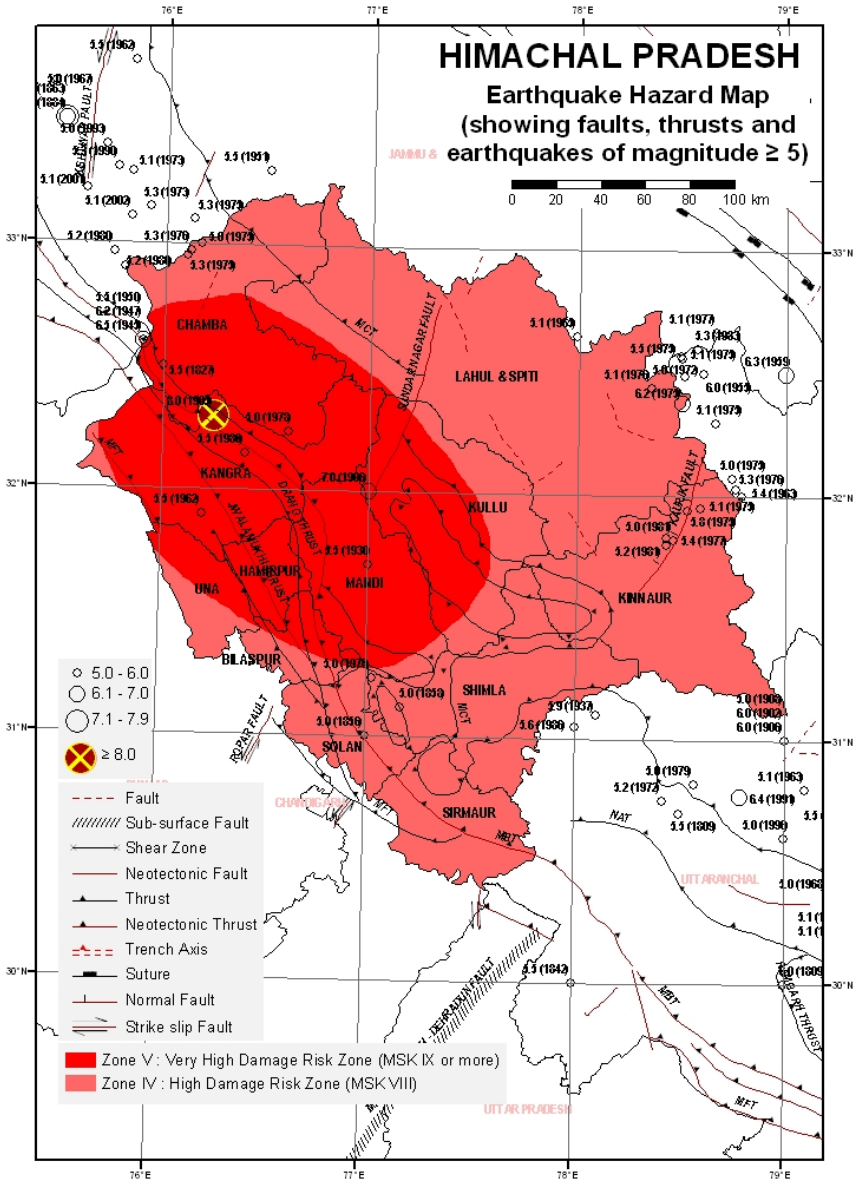
Table 3 - Availability of Training Institutions in Himachal Pradesh

Sr Number	Name of the District	Availability of Technical Institutions for the training							Grand Total
		NIT / IIT	Engineering College		Polytechnic		ITI		
			Govt.	Private	Govt.	Private	Govt.	Private	
1	Bilaspur	0	0	1	1	0	3	0	5
2	Chamba	0	0	0	2	0	5	0	7
3	Kangra	0	0	2	1	1	14	1	19
4	Hamirpur	1	0	2	2	4	6	2	17
5	Kinnaur	0	0	0	0	0	1	0	1
6	Kullu	0	0	0	0	0	3	0	3
7	Mandi	1	1	4	1	6	11	0	24
8	Lahul & Sapiti	0	0	0	0	0	1	0	1
9	Solan	0	0	2	1	4	5	2	14
10	Shimla	0	0	1	1	1	12	0	15
11	Sirmaur	0	0	2	0	1	7	1	11
12	Una	0	0	2	1	3	7	1	14
Grand Total		2	1	16	10	20	75	7	131

Table 4 - Availability of Staff for Training with Various Department in Himachal Pradesh

Category of the staff	No. of staff Available Department wise(As per the sectioned strength)									
	PWD	**I&PH**	**RD**	**PR**	**HIMUDA**	**TCP**	**UD**	**SSA**	**HPSEB**	**Total**
Architects	13	0	0	0	3	0	0	0	3	19
Town Planner, ATP,PO	0	0	0	0	0	42	0	0	0	42
Chief Engineer	7	5	0	0	1	0	0	0	4	17
SEs	27	20	0	0	2	0	0	0	8	57
XENs	106	79	3	0	9	0	1	0	27	225
AEs	374	263	36	4	29	0	4	2	117	829
JEs	1303	636	171	187	59	29	49	59	293	2786
Construction Super wiser	2005	636	0	0	0	0	0	0	6	2647
Mason	1738	247	0	0	0	0	0	0	20	2005
Black Smith	437	15	0	0	0	0	0	0	14	466
Grand Total	6010	1901	210	191	93	71	54	61	492	9093


MAJOR DISASTERS IN HIMACHAL PRADESH
Jammu & Kashmir
Chamba
Lahul & Spiti
China - Tibet
Kangra
Hamirpur
Una
Mandi
Kullu
Kinnaur
Shimla
Bilaspur
Solan
Sirmaur
Punjab
Uttarakhand
Haryana
1
2
3
4
5
6
7
8
9
50 0 50 100 Kilometers
LEGEND
District Boundary
[Source: Census of India, 2001]
Tehsil Boundary
[Source: Census of India, 2001]
ABC
District Name
[Source: Census of India, 2001]
Urban Area
[Source: Census of India, 2001]
1 Highest Intensity Earthquake of Magnitude 8.0 in 1905
Aprox. 19,800 people died in Kangra and Dharamshala
2 Earthquake of Magnitude 6.5 in 1906
26 people died, 45 severely injured in Shimla
3 Earthquake of Magnitude 6.8 in 1975
60 people died, 2000 dwellings devastated in Kinnaur
4 Landslide Disaster in 1993
Road (NH-22) stretch of about 1/2 km was completely damaged and slided debris blocked the river Sutlej. Traffic restored after two months
5 Flash Flood in 2000
140 people died, 400 shifted, 12400 sq km. area affected in Shimla, 3500 people and 56 villages evacuated in Shimla, Kinnaur, Bilaspur and Kullu
6 Flash Flood in 2003
35 people died in Gadsa Valley, Kullu
7 Avalanche in 1979
237 people killed in Lahul & Spiti
(Location in Map is approximately marked)
8 Human Induced Disaster – Temple Stampede in 2008
145 people killed in Nainadevi Temple, Bilaspur
9 GLOF in 1997
Washed away six bridges in the Sutlej basin and Kinnaur district was completely cut off
(Source: UNDP, www.managingclimaterisk.org)
EARTHQUAKE SAFETY INITIATIVE
Himachal Pradesh
SUPPORTED BY
PARTNER
IMPLEMENTED BY
EUROPEAN COMMISSION
Humanitarian Aid
aid
SEEDS INDIA
TECHNICAL SUPPORT
GIS Mapping Application Development
SPIN SYSTEMS Pvt. Ltd.
2.1



BMTPC : Vulnerability Atlas - 2nd Edition; Peer Group, MoH&UPA; Map is Based on digitised data of SOI, GOI; Seismic Zones of India Map IS:1893: 2002; Seismotectonic Atlas of India, GSI, GOI