Organized by

Karnataka State Police Housing Corporation

Bangalore

&

Bureau of Police Research and Development

New Delhi

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FOREWORD

Shri. M. N. Reddi, IPS
ADGP and C&MD, KSPHCL

Karnataka State Police Housing Corporation Limited (KSPHC) was incorporated in 1985 as a Special Purpose Vehicle (SPV) of the Government of Karnataka to cater to the construction requirement, both Residential and Non-Residential, for the Police and Allied Departments. Since its inception, KSPHC has constructed over **23000 Residential** and **Non-Residential buildings.**

KSPHC is now poised for a transition from being a company employing conventional technology to one exploring **(a) Process streamlining (b) utilization ofmodern components/technologies and (c) use of more advanced and standardized systems utilizing prefab technology** for meeting the huge demand for high quality, fast track, cost effective and environmentally sustainable Police Housing.

KSPHC is taking this giant leap from using conventional construction technologies to adopting modern and innovative technologies. KSPHC is heralding this new dawn of innovative initiatives.

KSPHC is well known for its innovativeness in various areas like CSR, managerial practices, environmental protection etc. It is also an ISO certified company with Quality Management System 9001-2008 and Environment Management System (14001-2004). KSPHC has been pioneer in the area of Green Building in India as it was the first Government organization to build a Green Building i.e. Police Bhawan at Gulbarga in 2005-06 that was given a Gold Rating by the US Green Building Council.

BACKGROUND:

- During the initial years, the turnover of the corporation was very meagre, in the range of less than a Crore (1988-89) to a maximum of Rs.18.29 Crore (1995-96). In June 2002, Shri Haranahalli Ramaswamy committee recommended closure of 21 State Government undertakings in view of their 'redundancy'. This list also included KSPHC. The corporation took this threat as a challenge and adopted various innovative measures such as
    - The **Web Based Project Management System** to execute and monitor its projects with total transparency
    - **e-Tendering** and **Reverse Auctioning** to facilitate fair competition and to minimize tender cost
    - **ISO certification** to set up quality parameters in its systems and processes
    - Integration of **WBPMS** with Tally for on-line bill payments

- amendment of the Objects clause of its MOA to include services for **infrastructure projects, information technology products and services, e-commerce portal** and **consultancy** and **training**

- In the Financial Year 2007-08, KSPHC switched over from 'No Profit and Loss' to Commercial Accounting **System based on 'Profit and Loss Statement'**. KSPHC has been posting profit and paying 100% dividend on the Paid Up Capital to the State Government since 2007-08. During the Financial Year 2011-12, KSPHC achieved a turnover of Rs. 164.35 Crores posting a gross profit of Rs. 21.68 crores and a net profit of 14.64 crores and for the Financial year 2012-13 KSPHC achieved a turnover of Rs. 160.78 Crores and posted a gross profit of Rs. 14.22 Crores.

NEW INITIATIVES

- KSPHC has constructed over 23,000 residential units under various schemes since its inception. For housing, KSPHC has successfully implemented Accelerated Housing Scheme I & II earlier. Currently, KSPHC is executing AHS-III in which 4,333 quarters are to be constructed within a budgetary outlay of Rs.440 crores.

  Recently, the Govt. of Karnataka has shown categorical commitment to increase the residential satisfaction level of Police Constabulary (PC & SI) from the existing level of 42% to atleast 80%. To achieve this, there is a need to construct 36,000 residential quarters across Karnataka. KSPHC has envisaged a new mega Police Housing Scheme- **"Police Gruha 2020".** To achieve this objective of the Government, in phase-1 of this scheme, KSPHC is going to construct 10000 - 11,000 quarters in areas where there is acute shortage of residential quarters.

  In order to meet the challenges of quality, time and cost overruns, KSPHC has been exploring suitable and innovative technologies. This exploration is also aimed to meet the challenges posed by scarcity of skilled labour, construction materials such as sand and consistently increasing prices of cement and steel.

- Conventional construction methods of **'Brick and Mortar'** have **proved to be inadequate** in meeting this challenge since these methods come with a host of drawbacks such as quality issues and time and cost overruns. Therefore, a **need was felt to explore and adopt modern and innovative fast-track construction methods including pre-cast and pre-engineered buildings** that are suitable to our needs and climatic conditions, to build high quality, yet quickly built modular homes in a cost effective manner.

- KSPHC has examined the suitability of **various pre-fab options** like:

  1. Light Steel Framing Structure plus gypsum wall panels
  2. Monolithic Concrete Construction using Aluminium and Plastic Formwork
  3. Steel frame and Light weight Aerocon wall panel technology
  4. EPS panels based pre-fab, fast-track construction technology from Pearls MiiHome Pty Ltd, Australia
  5. Steel frame and CFB composite panels with steel sheathing
  6. 3 D Panel Technology (EPS panel, steel mesh and concrete)
  7. Light Steel and Foam Concrete technology
  8. Bladepile Fast Track Foundation Technology.

- KSPHC has set up a **Fast Track Construction Technology Park** in Audugodi, Bangalore, where the customer/user department gets to see all the new technologies in one place and select the technology of their choice.

- The following technologies were used to build model G+1 houses in the Fast Track Construction Technology Park:

1. Prefab Construction Technology using EPS Panels - **Pearls Mii Home Pty Ltd, Australia.**
2. Steel Frame and CFB Composite Panels with steel sheathing - **Finish Profiles, Netherlands**
3. Steel plus Light Weight Aerocon Wall Panels - **S & G Metal Industries, India.**
4. Foam Concrete Technology- **Society for Development of Composites, Bangalore, India.**
5. 3 D Panel Technology (EPS panel, Steel Mesh and Concrete) – **Baupanel, Spain.**
6 Bladepile Fast Track Foundation Technology - **Bladepile group, Australia**

KSPHC Fast Track Construction Technology Park – Residential Houses (G+1) were built within 15 days to 30 days using various pre-fab construction technologies.

Pearls Mii Home Pty Ltd., Australia

Finish Profiles, Netherlands

S&G Metal Industries, India

Baupanel, Spain

Society for Development of Composites, India

All these buildings have been tested for conformity to the standards and specifications of National Building Code

- KSPHC is also keen on **fast track foundation systems like helical screw piers** to help it reduce the long construction cycles stretching the project management requirements and addressing the issues of time and cost overruns, while assuring high quality products to the users. Therefore KSPHC in collaboration with Bladepile foundation System, Australia has used Bladepiles for the above projects.
- Besides the implementation of the above mentioned technologies, KSPHC has also addressed the **issues of leakages in the buildings.** For water proofing, KSPHC has decided to use the Polyurea based advanced coating systems.
- The Corporation has decided to standardize and uniformly adopt **modern components and specifications** across buildings constructed under various schemes and irrespective of the technology used. These are vitrified tiles in lieu of mosaic tiles, UPVC windows, Green Wood Door Frame with GRP/ Composite Panels, Rain Water Harvesting, Solar energy panels, CFL/LED lighting etc.
- **Packaging of Works:** KSPHC is facing the challenge of effective supervision and monitoring of small volume of scattered works that are geographically spread across Karnataka. The problem is further aggravated by multiple contractors as tenders have to be awarded on individual work basis. Therefore, KSPHC has decided to make small p**ackages consisting of works, covering two or three adjacent districts.** During the Financial year 2012-13, works pertaining to K-Safe, 13th Finance Commission and other Deposit Contribution works were tendered on package system.
- **Advance Annual plan:** has been devised to expedite pre-construction formalities and processes like identification of clear sites, site survey and soil testing, design, estimation, approval of User Department, tender process etc. as these activities have a bearing upon the project completion period and therefore on the cost. KSPHC has decided to follow an Annual Advance Plan for a particular financial year. This plan stipulates and prescribes fixed time frames for all the major activities up to the stage of issue of the letter of award to the contractor.
- **Human Resource Development:** The rapid growth of the Corporation was made possible due to the contribution of the staff and management. The Management focuses on capacity building, continuously encouraging its employees to acquire, update and upgrade knowledge and skills in their respective areas of work.
- **Corporate Social Responsibility:** CSR is a key focus area of KSPHC. KSPHC believes that growth has to be inclusive. For ensuring long term profitability, KSPHC intends to invest in sustainable development of communities and environment.
  - **Enabling communities to develop their potential through Skill Training Centre:** The Corporation established a Skill Training Centre in 2004 to train the unemployed youth in basic construction skills such as masonry, bar bending, plumbing, carpentry, electrical works, etc.
  - KSPHC is exploring setting up of **Prison Industries** as a backward integration strategy as well as a CSR measure.

Important Awards & Accolades received by KSPHCL:

- Golden Peacock Award for best CSR practices 2005, eco Innovation(2006) and Innovation Management (2007)
- 3rd CIDC Vishwarkarma Award for Best Professionally managed Company(2011)
- 4th CIDC Vishwakarma Award under the category **Achievement for Best Project for "Audugodi Police Constables' Model Flats-Built in 15 days"**
- Received the First ever **Platinum** rating in the Government Sector for a residential building for Police Constables' Model Flats built in just 15 days, from Indian Green Building Council.

- **Chief Minister's Annual Ratna Award:** Karnataka State Police Housing Corporation has been selected as one of the three Best Performing State Undertakings and conferred the Chief Minister's "Annual Ratna Award" for the financial year 2012-13.

KSPHC has committed to make all its buildings to be constructed in future at least **"Silver Rating Compliant"**, under the IGBC Green Home Rating System and this was announced in the recently organized 3rd All India Police Housing Conference in May 2013 at Bangalore.

KSPHC believes that these new technologies will help us break out of the vicious cycle of **'cost-quality-time'** constraints and attain the norm of **'fastest, best and lowest-cost', in this sector.** KSPHC believes that Technology is the only way forward!

M.N. REDDI

M.N.Reddi, IPS, is an Additional Director General of Police. He has an M.A. and an M.Phil in Sociology from Jawaharlal Nehru University, New Delhi. In his 29 years of service, he has held important executive and staff police positions including Deputy Commissioner of Police, Traffic and Additional Commissioner of Police, Traffic and Security of Bangalore city. He also served as Inspector General of Police, Karnataka State Human Rights Commission and Additional DGP, CID apart from working as the Fire and Emergency Services IGP of Karnataka state.

He conceptualized and initiated the implementation of several transformational projects including a comprehensive ICT project for Police called POLICE-IT 2000; Rs. 230 Crore K-SAFE 2010 (Karnataka State Accelerated Fire and Emergency Services Improvement Project 2010) and Rs. 250 Crore B-TRAC 2010 (Bangalore Traffic Improvement Project 2010). B-TRAC 2010 aims to improve the city's traffic through the implementation of a spectrum of Intelligent Transportation System (ITS) measures. In his current assignment as Addl DGP & Chairman and Managing Director of Karnataka State Police Housing Corporation Ltd, Mr. Reddi has successfully implemented several innovative and fast track construction technologies in an effort to achieve quick, high quality, and cost effective construction of Police buildings, on a mass scale. The efforts of his organization in promoting Green buildings have been recognised by the Indian Green Building Council in awarding the first ever PLATINUM rating in the country, in the Government Residential sector. During his stewardship the corporation has won the Chief Minister's Annual Ratna Award from the Government of Karnataka for the year 2012-13.

Mr. Reddi has attended, as an invitee speaker and as a presenter, many international conferences on traffic management and road safety. He brought out a report entitled "Road Safety in Developing Countries - A case study of Bangalore city", during a sabbatical with the Transport Research Laboratory, UK. He has initiated an important report on corporatisation of non-core Police functions.

Mr. Reddi has wide ranging professional interests including traffic management, road safety, fire and rescue, disaster management, human rights, police computerization, fast track construction technologies, green buildings, and corporatisation of non-core police functions. He is a recipient of the prestigious President's Police Medals for Meritorious Service as well as Distinguished Service.

Inauguration of KSPHC Fast Track Construction Technology Park

Venue: Adugodi, CAR (South), Bangalore, Time: 9:15 AM

KSPHC has set up a **Fast Track Construction Technology Park** in Audugodi, Bangalore, where the customer/user departments get to see all the new technologies in one place and select the technology of their choice.

The following technologies were used to build model G+1 houses in the Fast Track Construction Technology Park:

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3. Steel plus Light Weight Aerocon Wall Panels - **S& G Metal Industries**
4. Foam Concrete Technology - **Society for Development of Composites, Bangalore &**
5. 3 D Panel Technology (EPS panel, Steel Mesh and Concrete) – **Baupanel, Spain**

During the 3rd All India Police Housing Conference 2013, KSPHC Fast Track Construction Technology Park was inaugurated by the Hon'ble Home Minister Shri K.J. George in the presence of Shri Anant Kumar, Hon'ble MP, Lok Sabha, Bangalore South, Shri. Ramalinga Reddy, Hon'ble Transport Minister, Govt of Karnataka and a host of senior Police officers and delegates from Karnataka and all over India.

Hon'ble Home Minister Shri K.J. George, unveiling the plaque during the inauguration of the KSPHC Fast Track Construction Technology Park.

Glimpses of the Inauguration of KSPHC Fast Track Construction Technology Park, Adugodi, Bangalore on 30th May, 2013

Inauguration of the 3rd All India Police Housing Conference

Venue: Hotel Lalith Ashok, Bangalore, Time: 10:00 AM

The conference was inaugurated by Shri Siddramaiah, Hon'ble Chief Minister of Karnataka in the presence of Shri. K.J. George, Hon'ble Home Minister, GOK, Shri. Lalrokhuma Pachau, IPS, DG& IGP, Karnataka State, Shri. V. Umesh, Addl. Chief Secretary (Home) GOK, Shri. Radhakrishna Kini, ADGP, BPRD and a host of senior officers, delegates from all over the country and representatives from the construction industry and other stakeholders.

Shri. Siddramaiah, Hon'ble Chief Minister of Karnataka lighting the lamp during the inauguration of the 3rd All India Police Housing Conference

Shri. V. Umesh, IAS,
Addl Chief Secretary-(Home), Govt of Karnataka

Excerpts from the welcome address

At the outset, let me welcome everybody to Bangalore and to the conference. You have come at the right time. We have the new Government in place, new enthusiasm and the weather in Bangalore is very pleasant.

Friends, Hon'ble Chief Minister has taken charge just a few days ago. He has been having hectic schedule. In spite of his busy schedule, he has found time. Recently he has reviewed the Police Department work.

Hon'ble Home Minister Shri. K. J. George has also taken charge very recently and he also had meetings with various wings & units of the Police departments. He has planned out the inspections in different parts of the state on priority.

Briefly to bring to the notice of the Hon'ble Chief Minister and everybody, KSPHC has completed 28 years. In these 28 years, it has provided support to the Department in the form of construction of residential and Non-Residential buildings. Almost 80% of all Police outposts, Police stations and various other police offices (NRB) are located in own buildings. Construction of many of these buildings was undertaken by KSPHC.

In the same manner, we have nearly one lakh Police force in the state of Karnataka. Roughly 40-45% of the Police force, starting from constable upwards, have their own quarters and buildings. For rest of the buildings (both residential and Non-residential buildings) the Hon'ble Chief Minister has assured that he will be supporting us in next 2-3 years to take up construction of remaining buildings on priority and complete the same. Apart from constructing buildings for Police Dept as you all know, KSPHC has been supporting the allied services like the Prisons Dept, Fire Force, Home Guards and various other Depts and also they used their expertise to take up construction for other Govt Depts. So, in this direction, KSPHC has been doing excellent work. My colleague, CMD, Mr. M.N. Reddi, is heading the organisation and they are co-sponsoring this event with BPR&D. I welcome all the delegates to this conference.

Shri. K.J. George,
Hon'ble Home Minister, Govt of Karnataka

Excerpts from the address

I appreciate the enthusiasm by KSPHC to host this conference at Bangalore. KSPHC is well known for its innovative managerial practices, be it the area of information technology, corporate social responsibility or other innovations like e-tendering, environmental friendly technology etc. I am proud that KSPHC has taken a lead in the county in the area of IT through Web Based Project Monitoring System, setting up Skills Training Centre as a Corporate Social Responsibility initiative and also by constructing Green Buildings. For these achievements I congratulate KSPHC.

Police Housing is one of the crucial areas of Police infrastructure that needs urgent attention. Police Housing is equally important for all the states and today the heads of all states and representatives of all the Police Housing Corporations in India have gathered here for this conference to discuss various issues relating to Police Housing and formulate a plan of action. This conference aptly focuses on critical areas of cost, time and quality and how technology can be a solution to these problems, besides discussing sustainability and financing of Police Housing. As we all know, construction industry is facing the challenge of scarcity of labour and construction materials especially sand. Costs of steel and cement are showing continuously increasing trend. Hence, problems of cost and time overruns have to be tackled effectively by choosing a suitable technology and construction methodology without compromising on quality of construction.

Sustainability is another area of construction which has to get more attention in recent times. We cannot neglect our mother nature and whatever technology we choose has to be sustainable and environment friendly. I am confident that today's discussion on sustainability will also indicate the course of action to be taken by not only the police housing corporations but the construction industry at large. Tomorrow, I see that you are going to have a discussion on 'Financing'. Mobilizing the financial resources to meet the gap between the present residential satisfaction level and the desired satisfaction level is of paramount importance. It is a big challenge to find out a pragmatic and prudent financing mechanism to fund the requirement needed to achieve the desired residential satisfaction level of at-least 80%. Mobilizing funds from international multi-lateral funding agencies like ADB and World Bank, at reasonable rates of interest, must be also explored. Shortage of Police Housing is an acute problem in urban areas like Bangalore. It is often difficult to find sufficient land for construction of quarters where Police stations and other establishments are located. Therefore, it would be a good idea to acquire land close to Public transport nodes like Metro Train stations, Circular Railway Stations and major Bus Depots. On these pieces of land, it will be advisable to construct police colonies in multi-storied configuration so that they can commute to their places of work quickly and in comfort. As a whole, I hope that discussions and deliberations of this conference today and tomorrow will show us the future path.

Apart from Police Housing, which is no doubt a high priority area, there are various other areas like construction of new police stations, police training schools, up-gradation of existing Police training schools, providing infrastructural facilities, security in coastal and naxal affected areas etc which are equally important. Similarly, strengthening the Fire and Emergency Services, Prisons etc is also important as they all form the criminal justice system and nation security infrastructure. For all this, funding resources as well as appropriate technology, construction methodology and management are required. I sincerely believe that the discussions, deliberations and recommendations during the conference will help us get a better insight and enable us to tackle the problem of Police Housing and other related issues in a time bound and effective manner.

Shri. Radhakrishna Kini, IPS

ADGP, BPR&D, New Delhi

Excerpts from the address

The 1st conference was held in 2011 at Ahmedabad followed by the 2nd in Patna. These conferences are hosted by State in collaboration with BPR&D every year where a platform to all heads of the PHCs and technical experts is given to meet annually for deliberating upon various technical and administrative issues relating to construction of various modern low cost and high quality infrastructure with pre-specified time frame creating a better living and working conditions of our Police forces both in State and UTs and Central Armed and Police forces.

The outcome of this conference provides useful inputs and it facilitates exchange of ideas relating to Police housing design, architecture, availability of new and economical construction materials and various other technical issues relating to Police infrastructure and Building construction.

At present, 21 states Police Housing corporations out of the 28 state and 7 UTs are functioning with the main objective of undertaking quality construction of Police and Central Armed Forces Buildings for providing a decent housing to the members of state Police forces.

In the field of construction, most of the countries are progressing rapidly in employing new and innovative fast track technologies instead of conventional technology. Therefore there is an inescapable need to adopt those modern and innovative technologies which are suitable to our needs to provide comfort even in adverse climatic conditions. I hope that participating Police officers, engineers, architects would interact and share the experience on the modern and latest building technology, difficulties in implementing these techniques and also financial difficulties in implementing these techniques during this conference.

This conference will also help all the participants to address the other administrative difficulties in a professional manner. At this stage, I would emphasize that we must take a drive to provide modern, eco-friendly buildings, Police Training institutions and support facilities, Police stations, Police Houses. To ensure hygienic working conditions to all Police personnel and officers, this will not only provide necessary comfort to our Police personnel but also keep them healthy at all times for extending their best services to the public.

Therefore all efforts have to be made by the state Police housing corporations to plan and construct such needed police infrastructure in a time bound manner. There is no doubt that a lot of efforts have been put in construction of Police infrastructure during last 10 years. However, still there is a lot of scope for improvement in the area of Police infrastructure.

Providing a decent and adequate number of houses of Police Personnel has remained a major concern over the last many years. According to the data on Police Organizations published by BPR&D, as on 1st Jan, 2012, 5,46,000 family qtrs were available as against the strength of 16,60,000 Police Personnel(all ranks). The

percentage of satisfaction of family accommodation is only 29% in upper subordinate (from ASI to inspector) and 25% in lower subordinate (inspector and below)

All India expenditure compared to State Budget stood at just 2.70% for the FY 2011-12, just a meagre amount. This needs to be revised urgently. I hope this conference will deliberate on this point also and pass a resolution to this effect. I am sure, during next 2 days all the delegates will update knowledge on various technologies related to Police housing and also share them with other delegates. This value addition will assist them to meet various challenges for creation of better Police infrastructure in professional manner.

Now a days a cost effective housing is a new concept which has become a need of every organization. This concept deals with effective budgeting and following the technique which help in reducing the cost of construction through use of locally available raw materials along with improved skills and technologies without sacrificing the strength, performance and life of the structure. Besides this, various new concepts have emerges with rapid phase in development of new infrastructure and same are to be incorporated in our futuristic development plans.

A few concepts may be prefab technology, ZNE(Zero Net Energy) Building, concept of Solar Pacific architecture.

Finally I would like to appraise the house, that one model Police station(grade 6) has already been constructed in Sahnival in Punjab and Salt lake, calcuttta, west Bengal during the 11th Plan period. BPR&D will be providing Rs. 2 crores each for the construction of similar model Police Station (grade 3) in Manipur, Mizoram and Rajasthan during the 12th Plan.

Shri. Siddramaiah,

Hon'ble Chief Minister, Karnataka

Excerpts from the address

My cabinet colleague and Home Minister has inaugurated today morning KSPHC's Fast Track Construction Technology Park at City Armed Reserve (South) Police Colony, Adugodi. I am told that 5 residential units are constructed by KSPHC with innovative, cost efficient, environmental friendly and Fast Track technologies of international standards and pre-fabricated technology developed in Australia has been used.

Police is an extremely important wing of the government as it deals with the most critical area of public safety and security. Policemen today face many challenges in their work which perhaps no other organ of the Government faces. It is for this reason that the Government has to ensure that the morale of the police is kept high so that they can discharge their duties effectively with people-friendly approach. We are concerned about the constabulary and sub-inspector level officers who have to be on duty for long hours. Considering their nature of duty, I personally feel that, taking care of their housing requirement is of utmost importance. Any dislocation in family due to non-provision of housing has a direct impact on the quality of the service rendered by the police force, particularly at the cutting edge level.

At present, residential satisfaction level in Karnataka is approximately 40%. We would like to bring it to atleast 80% satisfaction level which will be a good bench mark compared to various other states. I would like to impress upon the concerned officers to work out a time-bound program so that the satisfaction level can be increased from the existing 40% to 80% that requires construction of approximately 35000 quarters over a period of 10 years. We will explore all the possibility of adequate and proper funding so that we can achieve this target as a priority item.

Talking of the Karnataka State Police Housing Corporation, it was set up by the Government in 1985, and it has evolved into a vibrant organization. The corporation has built the first Green Building in the Government Sector in India, i.e. "Police Bhavan" at Gulbarga which was given Gold rating by the US Green Building Council. Further, A pre-fab Building constructed by KSPHC at Adugodi, Bangalore, one and half years ago had got a Platinum rating by Indian Green Building Council. This is the first residential building built by the Government Sector in the country to get a Platinum rating. Thus the achievements of KSPHC over the years have been significant, it is evident by various awards and appreciations received at state, national and international levels.

The corporation has grown from small turnover of an average Rs. 8 crores to over Rs. 150 Crores within a short span which is highly commendable. This growth has been achieved without commensurate increase in its manpower. It means that its management and employees of the corporation have increased productivity over the years. I wish Karnataka State Police Housing Corporation all successes in the years to come.

On this occasion, I compliment the Karnataka State Police Housing Corporation as well as Bureau of Police Research and Development, for their efforts in organizing this function with a prime objective of carving strategy to meet the housing needs of the Police Personnel. I hope issues relating to Police housing will be discussed in constructive manner in this conference as the requirement of Police Housing and other related problems and challenges are common to all the states. I expect that the discussion will lead to a common strategy and recommendations which will help our state to formulate a concrete plan of action as well as the Central Government to consider the specific requirements of our State.

THEME : 1
Meeting the Challenges of Cost Time and Quality- Technology as a Solution

Dr. C. S. Viswanatha

Chairman, Task Force on Quality Assurance in Public Constructions, Govt. of Karnataka & Chairman, Civil-Aid Technoclinic Pvt. Ltd.

Mass-housing is a necessity to provide shelter to the needy on a large scale. It may be for the needy public or employees of industries or for the general staff of Public / Private organizations or likewise. Off late, this is gaining importance and several such mass-housing projects are seen all around.

Essential requisites of Mass Housing:

In contrast to individual houses, the requirements in mass housing are quite challenging. The requirements to be essentially looked into are :

A. Quality of construction;

B. Time required for construction; and

C. Cost of construction.

a. Quality in any construction is assessed by Safety of the structure; performance of the structure during its life span and durability of the structure. It is not just enough if the safety of a structure is estimated for only the anticipated live loads. It is also essential to check the safety and stability of the structure with respect to the prevailing wind loads and with respect to the possible earthquake loads.

The National and International Standards concerning housing projects have defined all these very explicitly. The Indian Standards documents are the governing ones for our constructions.

b. There are several parameters which decide the performance of the structure during its lifetime. The important ones are :

- Thermal efficiency of the construction during Summer and Winter;
- Acoustics efficiency;
- Damp proofness/water tightness of the construction during rains;
- Efficiency of the joinery systems and
- Fire resistance characteristics of the structure

Normally, a fire rating of two hours is a reasonable index.

c. The important yardsticks for durability assessment are :

- Deterioration of components with age;
- Deterioration of components due to atmospheric pollutions;
- Deterioration of foundation system due to polluted / chemically adverse soil media and+
- Life expectancy.

Our normal housing constructions are designed for a life of sixty years and above.

d. In the present day context, it has become essential to go in for faster constructions in order to meet the heavy demand and in order to cut down wastage and overhead charges.

The traditional constructions being adopted around us is basically 'slow track construction' and not amenable for mass-housing projects. On account of the undue time taken, the overheads and wastage will be quite high.

Further, there is too much of dependency on cement, aggregates and water in these traditional constructions. In particular, the fine aggregate (sand) and water are quite scarce. It is also seen that, on account of shortage of skilled labour, these constructions today, in general, are not upto the mark in terms of quality.

In addition, traditional construction cannot be “green buildings” normally. But, green buildings are the order of the day, in view of energy scarcity and, fast depletion of precious natural resources.

D. The mass-housing can generally be classified as :

i. Large number of houses (i.e., cluster) concentrated in any specific location, such as in cities;

ii. Houses which are spread over in different locations, but still with significant numbers in each location

iii. Houses which are spread over in different locations, but few in number in different locations; and

iv. Temporary houses likely to be shifted to other locations frequently.

In case of the first one, there are several options for construction. Houses can be assembly of precast concrete components or assembly of prefab steel elements or integral in-situ concrete constructions with improvised form-work. Enough expertise is available to produce precast concrete houses. Off late, improvised form-work systems also have been developed to take up integral concrete constructions. The choice depends on the expertise available at that particular location.

i. Whereas when the houses are spread over, but still in significant numbers in any location, again we can go in for either precast constructions or prefab structures or integral concrete constructions.

If concrete constructions (i.e., precast or integral) are chosen, one has to ensure the availability of natural sand and water fit for constructions. In today's context, this is not easy enough. In either case (precast or integral), skilled labour, in plenty, is a pre-requisite and certain degree of mechnisation is involved.

ii. When the houses are spread over and few in numbers in any location, due to logistic problems and due to lack of availability of skilled workmanship, integral in-situ constructions or assembly of precast units is not a viable proposition. The answer for such cases is assembly of prefab steel components and insertion of precast concrete or prefab panel members. Since thermal and acoustic efficiency are very important, the choice is on composite (sandwich) prefab panels with any 'acoustic and thermal proof' infill material. Generally expanded polystyrene or similar materials are sandwiched in the panels. Alternatively, the panels can be in-situ foam concrete or aerocon precast panels or equivalent ones.

E. Today's requirements in mass housing constructions are 'introduction of the essentials of green buildings'. This normally cannot be achieved in traditional constructions. The greenness in the buildings can be ensured either during pre-construction by choice of right materials or through appropriate designs or by both.

i. Prior to construction, it is preferable to decide on materials that consume minimum energy during its process. It is also preferable to use recycled materials, wherever possible and preferable to utilize industrial wastes, wherever possible. It is a must to avoid or minimize usage of beneficial natural resources.

The architectural design (i.e., planning) has to ensure :- Minimum consumption of power during service to keep interior comfortable;

- Natural ventilation; and
- Dependence on solar and wind systems for energy needs.

It is obvious that in the type of constructions mentioned above, these greenness concepts can be easily introduced. In several green constructions, waste debris and waste plastics are being recycled, flyash / slag are being beneficially used, timber joinery is being avoided, Sandwiched composite joinery is being used, manufactured sand is replaced by natural sand and several such beneficial measures are being introduced.

F. Several general case studies are being discussed in what follows (Case study 1 to 6)

CASE STUDY – 1
INTEGRAL IN-SITU CONSTRUCTION (MASS-HOUSING)

One of the mass housing projects

Finished 'mass houses' - integral type

Case Study – 2 : Light Gauge Steel - Foamed Concrete Composite Construction

Composite construction – Light gauge steel skeleton

View from top - Composite construction

Case Study – 3: Assembly of Precast Concrete Elements

Assembly of precast concrete elements and in-situ floors and roofs

Assembly of precast concrete elements and in-situ floors and roofs

In-situ floors and roofs

A completed structure

Case Study – 4 : Prefab Steel Construction

Typical Prefab housing

Case Study – 5 : Composite Construction with Expanded Polystyrene Panels

Baupanel technology Expanded Polystyrene panels in position

Application of micro concrete to polystyrene wall panels under progress

Concreting of floor

Construction of roof in progress

Finished construction (Typical)

Case Steel – 6: Steel Skeleton with Precast Panel Infills

Steel skeleton with Aerocon panel infills

G. The specific ones proposed to be adopted in Karnataka Police Housing Corporation are :

- Pearl Mii home Technology;
- Baupanel Technology;
- Foam Concrete Technology;
- Aerocon Infill System, and
- Finish Profiles infill Panel System.

They totally belong to any one of the classifications listed in 'D'

H. There are quite a few Acceptance and Confidence Tests to accept or otherwise, any construction. The ones which are relevant to mass-housing are :

- Load tests on floor and roof;
- Lateral load tests for wind loads;
- Shaking table test on models for earthquake loads;
- Dampness & leak tests;
- Thermal and acoustics efficiency tests;
- Accelerated durability tests on the components; and
- Fire resistance tests.

These are all standard tests and give an insight into the performance and durability of the structures in general. A few of them are illustrated further.

Extraction of concrete core sample from concrete wall to check quality of concrete

Extraction of concrete core sample from roof slab to check quality of concrete

Load test on individual panels

Load test on floor with sand bags

Water ponding test in bath room

Nailing test on wall

Shock resistance test on joinery

Acoustic test

Thermal comfort test

(At inside of room)

(At outside of room)

Rain simulation test (alternative drying and wetting cycles)

Ponding test by storing water on roof slab in progress

Fire test (Confidence test)

I. Concluding Remarks

All the above discussed essential requirements are kept in view in the mass-housing constructions of Police Housing Corporation, which is evident in the demonstration houses. It is realised that these constructions can be fast enough (about 10 to 30 days) and relatively economical compared to traditional houses by 10 to 30 percent.

It is also evident that usage of cement, sand and water are minimum enough in these constructions. The components are light enough and can easily be transported and assembled at site by semi-skilled people.

The traditional houses and these novel constructions are at par as far as maintenance is considered. These houses are already widely accepted by the public wherever they are constructed.

Dr. C S Viswanatha got his Master's Degree in Structural Engineering from Indian Institute of Science Bangalore during 1962 with distinction. Subsequently he pursued his studies for doctorate degree there itself on the subject of “Creep Studies on Concrete Structures”.

He is a fellow of Institution of Engineers, Indian concrete Institute and Indian Institution of Bridge Engineers. His fields of specialization are Concrete Technology, Concrete Structures & Rehabilitation of Structures.

He started his professional Career at Indian Institute of Science during 1963 and at present he is with Civil Aid Techno - Clinic Pvt Ltd (A Bureau Veritas Group Company)., Bangalore, serving as its Chairman.

During 1988 -1990, he was President of 'Association of consulting Civil Engineers, India' and during 1999-2001 he was President of 'Indian Concrete Institute'.

He has to his credit, about 100 technical papers in National & International Journals. He is closely associated with several technical Institutions across the country in various capacities.

At present, he is also the Chairman of 'Task Force on quality Assurance in Public Constructions' set up by the Govt. of Karnataka.

He had the honour of declaring open 'Asian Concrete federation', in Japan during 2001.

He is the recipient of several National Awards such as:-

'National Design Award 2005', by Institution of Engineers (India) for significant contribution in the field of Engineering Designs, and 'ICI-L&T Life Time Achievement Award 2006', by Indian Concrete Institute for contribution in the fields of Concrete Technology & Concrete Structures.

He had the honor of delivering the Golden Jubilee Lecture (PG Studies) at Annamalai University in 2004, Professor Bimalendu Sen Memorial lecture at Kolkata in 2002, 3rd Professor G S Ramaswamy Memorial Lecture at Chennai in 2005 and the 1st Sir MV Endowment lecture at Viswewaraya Technical University in Karnataka in 2006.

In the field of Bridges and aqueducts, his contribution is enormous.

In addition to these, design of several bridges with both RC & PC spans have been undertaken under his guidance in Civil Aid Techno clinic Pvt Ltd.

In essence, his contribution in different areas of Structural Engineering, in the last five decades is significant.

Presentations on 5 Fast Track Construction Technologies used to construct model residential units at

KSPHC Fast Track Construction Technology Park

1 Foam Concrete Technology - **Society for Development of Composites, Bangalore, India.**

2 3 D Panel Technology (EPS Panel, Steel mesh and concrete) - **Baupanel, Spain.**

3 Steel Frame and CFB composite panel with steel sheathing - **Finish Profiles, Netherlands.**

4 Steel plus Light Weight Aerocon Wall Panels - **S&G Metal Industries, India.**

5 Prefab construction technology using EPS Panel - **Pearls Mii Home Pty Ltd, Australia**

Fast Track Housing & Building Construction using Light Steel - Concrete Technology

Dr.R.Gopalan
Executive Director
Society for Development of Composites, Bangalore

Light Steel - Concrete Technology is an Innovative, Fast Track Housing & Building Construction using factory made Light Gauge Steel (LGS) frames combining with Light Weight Foam Concrete (LFC) and Fiber Cement Boards (FCB). The LGS Frame is a 'C' Section, Cold formed Galvanized Iron produced by Computerised Roll Forming Machine, with built in notch, dimpling, slots, service holes, etc. These frames are assembled using metal screws to form into LGS wall and roof structures of the building. Provisions for doors, windows, ventilators and other cutouts as required are incorporated in the LGS frame structure. Typical LGS wall structure assembly for ground floor is shown in **Fig.1 & 2.**

The factory made LGS wall structures are transported to the construction site and erected wall by wall on a pre-built steel concrete floor. Heavy duty cement fiber boards are fixed on either side of the LGS wall structure using self-drilling/tapping screws to act as inner and outer faces of the wall, and leaving a gap between the outer and inner walls. This gap is then filled with light weight foam concrete using a special foaming and pumping machine. Electrical and plumbing pipes/conduits are fixed to the LGS structure before the foam concreting is done. The free flowing foam concrete slurry is prepared and pumped into the gaps between the two walls. The foam concrete fills the gap between the walls and also completely covers the LGS frames and fills even minute gaps in the LGS frame structural joints. After curing, it becomes a monolithic LGS reinforced foam concrete – cement fiber board sandwich composite structures with superior strength, stiffness, thermal and sound insulation properties. Schematic diagram of cross section view of LGS – Foam Concrete – Cement Fiber Board Wall is shown in **Fig.3.** The foam concreting is carried out, in two or three stages after proper fixing and erection of all the LGS wall structures and fixing of the cement fiber boards.

The roof structure shall be of two types: 1) LGS joist mounted heavy duty metal deck sheet with foam concrete or LGS Joist mounted heavy duty metal deck sheet fixed with heavy duty cement fiber boards, and 2) Conventional steel concrete roof structure. In the case of conventional roof, the steel - concrete structure is built by standard procedures namely, centering, steel re-inforcement and concreting. Ready mix concrete of M20 grade was used for casting the roof slab. After proper curing of the roof concrete slab, the centering is removed and then plastering of roof ceiling is done. All the joints between the cement fiber boards are finished using jointing compound and wall putty and the wall surface is painted. Doors and window frames are fixed to the LGS frames and then the door shutters with necessary accessories are fixed.

After completion of the ground floor, the first floor of the building is constructed using the same procedure that of the Ground Floor. The wall tiles are fixed on the cement fiber boards in the kitchen and the bathroom by using special jointing compound and the floor tiles are fixed using conventional method. The staircase, chejja and paraphet wall of the building are also constructed using LGS frame – cement fiber board structural assembly. The entire building is then painted and finished.

Materials used for Light Steel – Concrete Building:

1. Cold Formed LGS wall frame structure made of 'C' type GI Sections (A215 GSM Aluminium Zinc Alloy coated Steel having 550Mpa yield strength)
2. 12 mm thick moisture and fire resistant heavy duty cement fiber board wall panels on both sides of the LGS frame structure to form internal and external faces of the wall.
3. Light weight foam concrete (A mixture of fly ash/sand, cement and foam) having density – 1300 kg/m3 and compressive strength 4.5 Mpa.
4. Doors and Windows: Eco-friendly non-wood WPC / GRP door frames, HDF /GRP Sandwich composite door shutters and UPVC windows.
5. Finishing & Painting: Acrylic jointing compound, glass fiber tape, weather resistant wall putty and paint.

Salient features of the Light Steel – Concrete Building:

1. Light weight and strong.
2. Better Thermal and Sound Insulation.
3. Faster Construction.
4. Energy Efficient.
5. Long Life and Durability.
6. Earth quake, fire and cyclonic wind/tornado resistance.
7. Cost Effective.
8. Minimum Manpower.
9. Environmental friendly.
10. Versatility in construction.

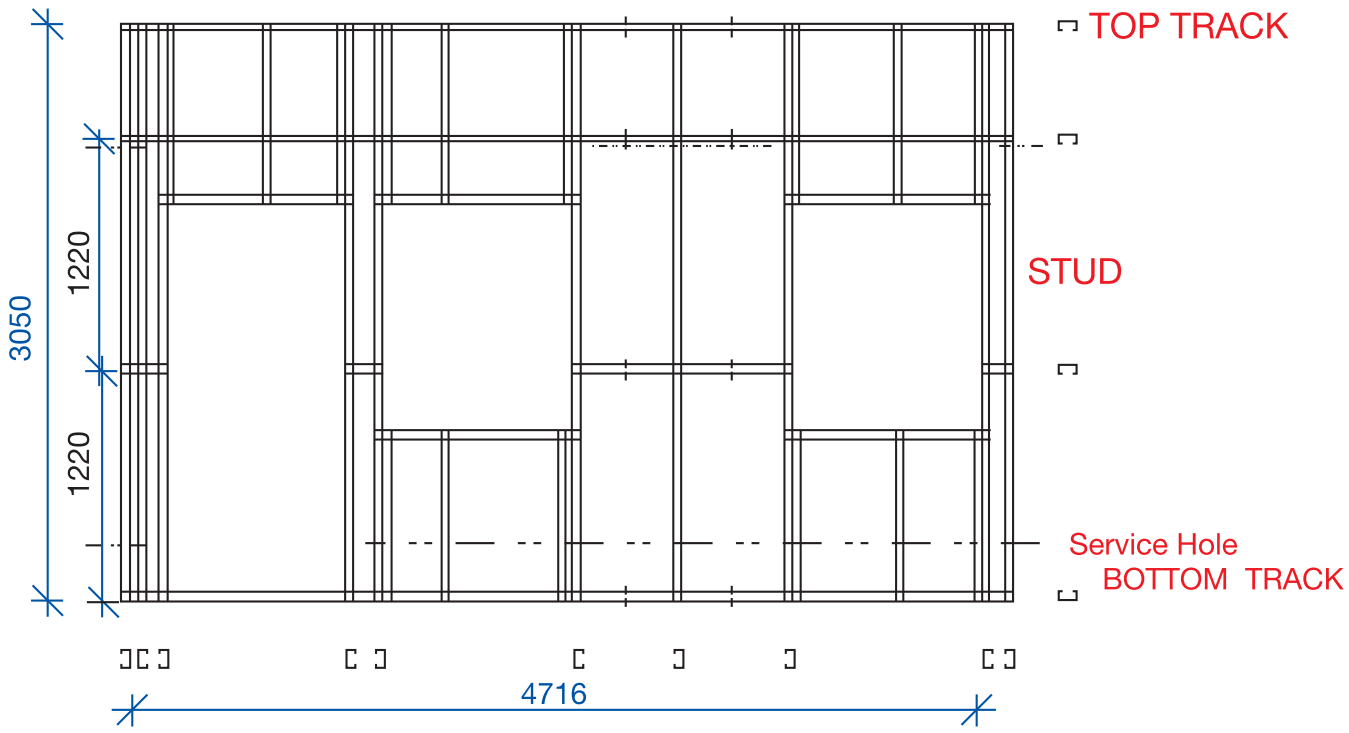


Fig. 1 - LGS Frame Structure for Front Wall

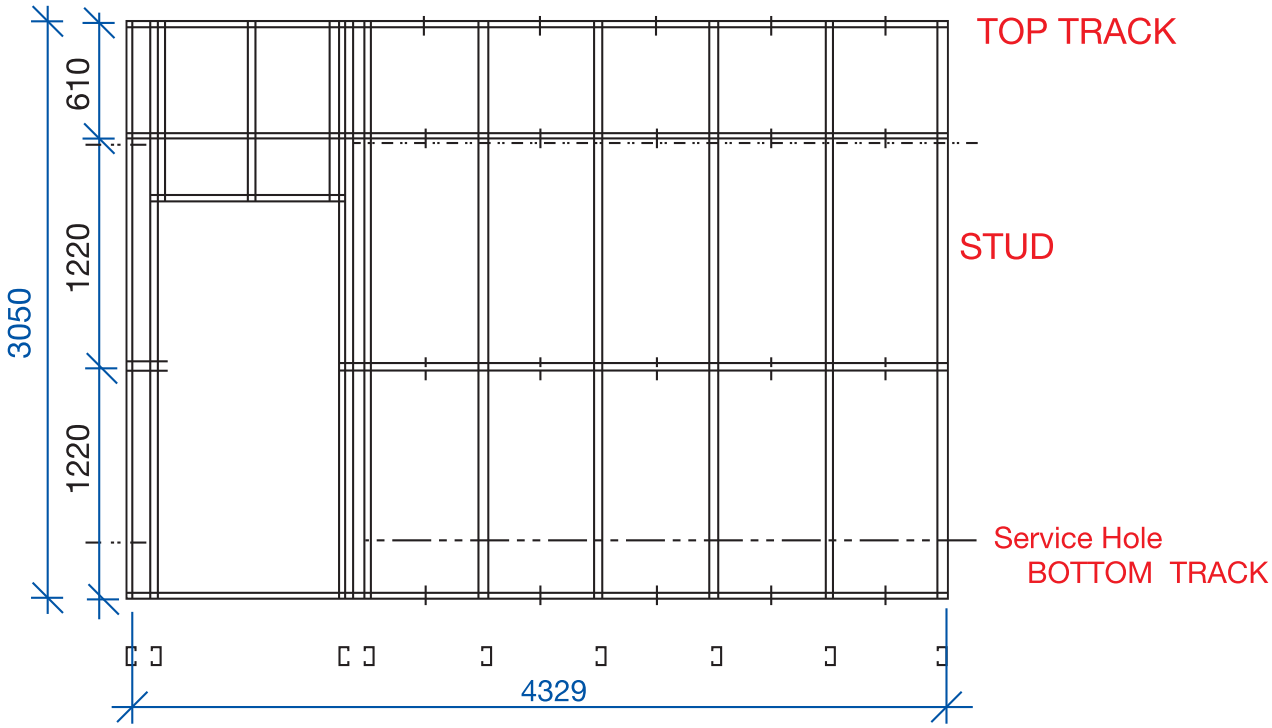


Fig. 2 - LGS Frame Structure for Bedroom Wall

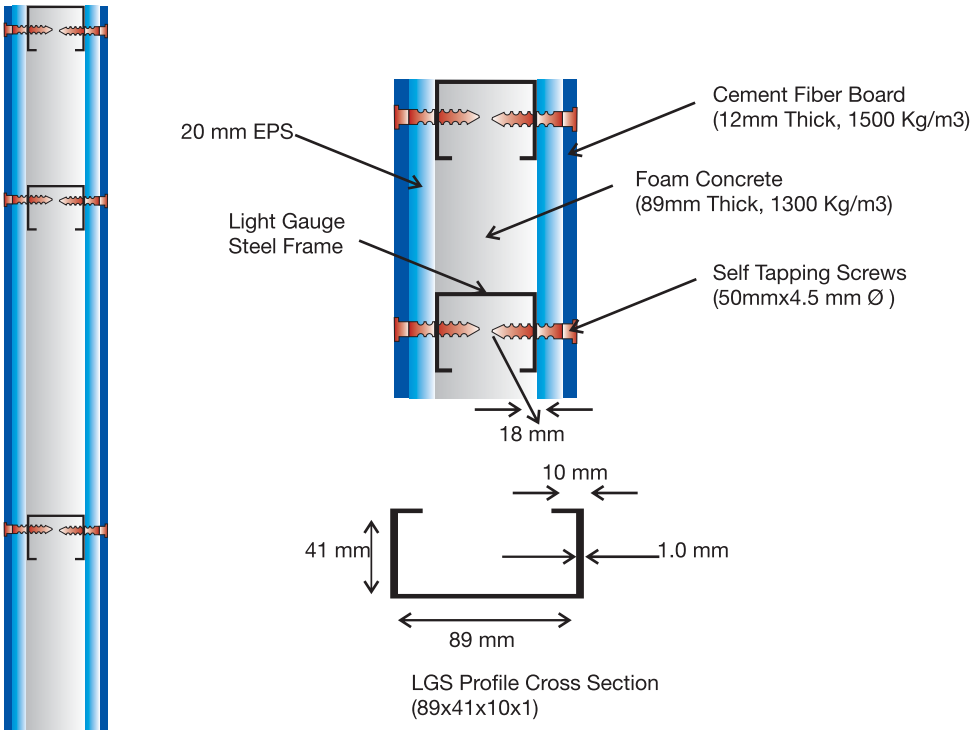


Fig. 3 - Schematic diagram of Cross Section of LGS - Foam Concrete Cement Fiber Board Wall

Build Process at the KSPHC Fast Track Construction Technology Park, Bangalore

A 2 PC Quarters (Ground + One) Demo building with a built up area of 161 m2 was constructed using **Light Steel – Concrete Technology for *Karnataka State Police Housing Corporation Ltd.,*** by Society for Development of Composites in collaboration with M/s. UltraTech Cement Limited, Bangalore M/s. SKC MTA Infrastructure, Hyderabad and M/s. R L Engineering, Bangalore. Photographs showing the construction work at various stages are presented in **Fig. 4 – 23.**

Fig.4 – Plinth & Foundation

Fig.5 – Erection of LGS Wall Structure

Fig.6 – Fixing of Cement Fiber Board

Fig.7 – Fixing of Cement Fiber Board

Fig.8 – Fixing of electrical &plumbing pipes

Fig.9 – G.F.Wall structure ready for Foam concreting rear view.

Fig.10 – G. F. Wall structure ready for for Foam concreting front view.

Fig.11 – G. F. Wall structure ready Foam concreting top view.

Fig.12 – Foam concreting in progress.

Fig.13 – Foam concreting closer view.

Fig.14 – Foam Concreting closer view.

Fig.15 – Fixing of LGS staircase.

Fig.16 – Steel reinforcement for G.F.roof slab

Fig.17 – Erection of LGS wall structure for first floor.

Fig.18 – Cement fiber board fixing for F.F

Fig.19 – Cement fiber board fixing for F.F

Fig.20 – Inside view of cement fiber board Fixing on 1st floor

Fig.21 – G.F.roof slab after removing the centering.

Fig.22 – Completed Ground and First Floor structure, ready for painting (front).

Fig.23 – Completed building, after Painting (rear view)

Baupanel® system: quality, sustainability and fast track construction to face the challenges of the 21st century in the building industry

Mamerto Gamboa Cerezo
Technical Director,
Baupanel® System., Spain

The traditional building has been used for the primary purpose of providing protection and security to the people against the weather for decades, not taking into account the impact on the environment of the resources used in the construction process or the use of the building in its lifetime.

The awareness of the construction industry is tending to a change in recent decades, being conscious of the need to be efficient in the use of material and energy resources as a basis for sustainable construction, investing now to get huge profits; medium and long term.

Quality, sustainability and fast track construction are the keys to face the challenges of the 21st century. Baupanel® system delivers an improved building solution that substantially reduces direct and indirect construction costs, optimizes the construction resources getting a fast track construction whilst at the same time being eco friendly basically reducing the amount of cement used in the construction, minimizing the wastage in the construction process and increasing the efficiency in the energy used in the life span of the building due to the use of thermal insulated structural elements with Expanded Polystyrene which is biologically inert, non toxic and stable, being Baupanel® 100% recycled and, whilst being lightweight, maintains the high load resistance of traditional building methods.

Basically Baupanel® system is

- An **industrial technology** applied to the building industry
- using a **different methodology** of construction
- which uses the **same materials** than traditional construction
- but **materials** are arranged in the **most efficient way**

Baupanel® system unique selling points:

The Baupanel® building solution is based on a set of structural panels made up of expanded polystyrene (EPS) with a basic frame attached to the side of the panels. The frame consists of highly resistant steel mesh and corrugated bars linked together with electrically-welded steel connectors.

It is a versatile building method and it can be adapted with other traditional and non traditional building methods.

The panels are installed on site according to the layout of the walls, partitions and framework of the project and they are finished on site by applying micro-concrete through a mechanism known as pneumatic discharge (shortcrete).

The panels constitute the structural elements of the vertical and horizontal fixings of a building. The structural

systems as well as the thermal acoustic insulation properties are designed to meet the building standards of the country where the construction takes place.

The configuration and construction method generates the following unique selling points:

1. Eco friendly:

Currently, the building and construction industry is responsible for consuming 40% of the energy produced all over the world. This sector also creates 25% of the worldwide waste.

Baupanel®, whose main component is expanded polystyrene (EPS), is an efficient and effective thermal insulating material that can make an important contribution to the reduction of carbon emissions into the atmosphere. In order to make it, no CFCs or HCFCs are used as foaming agents and therefore, EPS does not cause any damage to the ozone layer.

It is 100% RECYCLABLE. During the process of manufacturing baupanel® there is minimal waste. The waste that there is, is directly recycled within the production plant.

Expanded Polystyrene is biologically inert, non-toxic and stable. As a consequence, it does not contribute to gas methane and does not impact any risk for underground water springs.

Baupanel® buildings reduce their energy requirements with a positive impact on the environment as a result.

2. Cost savings:

Baupanel® system means a real advantage for end users as well as for building companies, as it provides many benefits compared to traditional building methods, using a construction methodology that reduced the direct and indirect costs.

Undoubtedly, having one element fulfilling two tasks at the same time (a high-resistance wall and thermo-acoustic insulation) is an innovative money saving approach.

3. Light-weight:

Thanks to the panel's light-weight qualities they are easy to move, transport and install.

The panel's light-weight construction is strengthened once the micro-concrete has been applied, ensuring the baupanel® structure's strength and integrity.

The weight per sqm of the panel before the application of the micro-concrete or mortar depends on the panel type, and ranges from 3.5 kg/m2 to 5 kg/m2. This makes it possible for just one worker to easily move more than 3 sqm of panel.

4. Quick installation:

Our experience all over the world has shown a real reduction in the building works execution time compared to those with traditional building methods.

5. Seismic resistant:

Laboratory tests carried out on a two floor baupanel® prototype house (made to scale) have proved that the structure is resistant to loadings higher than the effect of a category 1 earthquake without suffering any kind of damage. These scientific results can be supported as buildings built using our method all over the world have successfully survived strong earthquakes without any damage.

6. Choice of finishes:

Walls made with baupanel® can be completed with any kind of finishing.

It is possible to directly apply a coating on the micro-concrete or, alternatively, on the shell and core buildings. Traditional paints can be used directly on the panel once it is plastered.

You can apply any finish such as single coat mortar, acrylic mortar, stone sheeting, exposed brick, tiles, etc. In the same way, the inside walls can be finished with plaster or perlite coating, cardboard-plaster sheeting, tiling, etc.

6. High-load resistance:

Laboratory tests carried out internationally have proved the great structural resistance of Baupanel®.

Loads in buildings are distributed across many lineal elements (load bearing walls), whilst the work tension of the concrete is much lower than the maximum allowed for this material.

7. Thermal insulation:

The thermal insulated coefficient of a Baupanel® building can be designed according to the project specifications.

The K value of the total thermal resistance of a Baupanel® composed of a 4cm thick EPS (15 kg/m3) density with a 3cm thick micro-concrete on both sides by a total thick of 10cm is 0.78 W/sqm ºK.

If the wall is made with a panel 8cm thick expanded polystyrene (15 kg/m3 density) the K thermal transmission is 0.49 W/sqm ºK. This translates into an energy saving of nearly 40%, both for heating and cooling cycles.

8. Sound insulation:

The range of simple panels, with a 3.5cm concrete thickness on each side have an average acoustic insulation of 43.50 dBA.

9. Hurricane resistant:

Baupanel® buildings located in areas with high risk of hurricanes have shown great capacity to resist the most devastating winds.

10. Fire resistant:

The EPS used for making the panels is the Euroclass E type (self-extinguishing and it avoids the propagation of flames). Fireproof tests carried out on sheets made with BPR80 panel have proved a resistance of more than 240 minutes.

Baupanel® system features compared with traditional systems

Baupanel® system is the only technology which streamlines the implementation of effectiveness and efficiency at the same time.

By using normal and well known materials (reinforced concrete to withstand force and expanded polystyrene to provide thermo-acoustic insulation), utilised in such way that their properties are enhanced, satisfying all the building requirements that must be fulfilled, especially in the case of housing.

In this regard, it is worth mentioning that the main and fundamental requirement to be met by a construction destined for housing is the thermal insulation, the essential reason of its very existence.

And it is a result of the fulfillment of that particular condition that arises the need to satisfy other requirements, such as mechanical resistance, structural capacity, ease of implementation, the rational use of resources, architectural flexibility, fire resistance, good sound absorption; although each one has its importance, none of them reach that of the thermal insulation, and illustrates in this aspect the fact that if a house were to meet all the "secondary" requirements but had poor thermal insulation, such housing would be unsatisfactory for its occupants, regardless of the full compliance with all the other aspects.

This significantly affects the habitability of housing conditions and helps lower the cost of thermal conditioning, even in extreme conditions. This virtue has been testified through a myriad of constructions in the most diverse countries, with harsh weather conditions (Equatorial Africa, Antarctica or Siberia).

Associated with the high thermal insulation property mentioned can be found the advantageous total absence of thermal bridges due to the total continuity of the expanded polystyrene in the whole outer surface of the dwelling.

Economy - rational use of resources - ease of execution:

This is the point where the degree of industrialization reached by the system predominantly influences the implementation of civil works.

And it must be pointed out that even the most conservative and traditional systems, whose methods for various reasons we have grown accustomed to, also have their own degree of industrialization, aimed at optimizing the utilization of resources during execution.

It is therefore clearly rational to subject the Baupanel® system to critical judgement in light of the concepts that have sustained the use of the systems until now called traditional, this analysis not necessarily only being theoretical, but predominantly practical, since the number of constructions made in the entire world more than justifies such an attitude: in all the places in which it was used, it satisfied all the requirements, resulting in a better alternative for the implementation of housing, either from an economic or technical point of view.

Indirect savings – evaluation

The reduction of total costs that provoke the use of Baupanel® technology in place of traditional construction systems is clearly calculable by comparing direct costs of labour and materials.

However, there are a number of additional significant indirect savings when using our technology that are grouped into the following points:

Overheads

The reduction of grey work (foundations-structure-vertical enclosures-coverings- pipe works) leads to reduction in administrative costs lead time allows a reduction in administrative costs, energy for the movement of equipment, salaries of foremen, site managers and supervisors, depreciation of machinery, scaffolding, repairs, vans and cars for inspection and site managers, as well as financial expenses costs, financing and service interests.

This reduction in period of grey work that is closely related to the possible higher speed execution normally reaches 50%. In this way and considering that the grey work represents between 40 and 50% of the total work period, it would be possible to reduce the duration of the works by approximately 22%. If we consider that a construction company has general weighted expenditure of 15% of the sum of materials and labour, the application of the Baupanel® system will enable it to be reduced to 11.70%.

Secondary costs

Understood as the provision of labour and materials to cover the channels made in the walls by the installation of pipe works (electricity, water and gas) its participation in the reduction of total costs can be perfectly determined. By way of illustration, for a unit of 60 m2 a daily 1 worker and 1 helper are required to cover up all the channels; this leads in a reduction in costs of 1.40 %.

Cleanliness on site

This item has a particular importance given that the system has a single wet stage which is the application of the micro-concrete cement, while the elevation of walls is dry and with manipulation of clean elements that do not

produce debris. In addition, during the installation stage, there is no opening of channels and therefore there is no generation of debris with the consequent need of their collection and subsequent removal.

The volume of debris that is produced with a building made with factory bricks is normally 0.12 m3 per sqm covered, and the manpower that must be employed in cleaning and hauling is 3 hour-labour per m3.

Less total surface to equal floor space

Using Baupanel® technology enables a significant reduction in the thickness of the exterior and interior walls of a dwelling. By way of example, consider the thickness of the exterior walls of a traditional dwelling of 28 cm (double wall with air chamber) with a thermal transmittance K = 1.90 W/sqm °K and interior walls of 12 cm in total thickness, compared to Baupanel® outer walls of 15 cm of total thickness with K = 0.39 W/sqm °K and 10 cm thick interior walls. In this case, with equal useful floor area, a construction made with Baupanel® presents a decrease of total surface area equal to 5.74%.

Summing up the points listed above we obtain the indirect saving that, in addition to the reduction of direct costs, can be considered to exceed 15% and it is the reason why, Baupanel® technology can also be used in lieu of the traditional building systems in those countries where the cost of labor is very low.

Architectural flexibility

This aspect, although secondary, gains importance in some housing categories in that the architectural variables play a predominant role. This is so given that the functional needs as regards the daily habitability of the house are more variable with the habits, family composition and other characteristics of each customer.

For these reasons it should be considered as a genuine and important virtue the possibility of providing a constructive system for a wide range of architectural styles, as in the case of Baupanel®, whose possibilities in this regard are virtually unlimited, as well as simple.

General maintenance – adaptability with other building systems

Constructions with Baupanel®, once finished, require significantly less maintenance than usual. This is because it has a superior water-resistant insulating capacity resulting in longer duration of plasters and paints. It also helps towards greater mechanical resistance, which implies the absence of cracks in buildings.

As regards to the adaptability to combining it with other building systems, experience has shown that its capacity is not only wide but easy to implement, adapting to the more rational solutions for any type of join and combinations.

The constructive system is open. That is to say that it can combine or integrate with all other types of traditional or non-traditional building systems.

Picture 1.
Single family house under construction

Picture 2. 8 storey Baupanel building under construction

Picture 3. Huge housing development using Baupanel system.

Picture 4. 12 m height partition wall in a warehouse

Picture 5. Sheeting of a pile wall in 2 km length tunnel

Build process at KSPHC Fast Track Construction Technology Park

Foundation

Erection of EPS panels

Ground floor roof

Plumbing and electricity

Micro-concrete

Finished model flat

Why Finish Profiles' Pre-Fab is not just a temporary solution

Ameer Bahl
Director, Finish Profiles India

While the world strives to become more efficient; increasing efforts are put into finding new ways to make everyday functions clean, green & cost efficient. The construction industry is no exception. Over the last 20 years there have been impressive breakthroughs allowing standard methods of construction to constantly evolve; using less material for stronger results. A prime example of this is Prefabricated (Pre-Fab) Housing & Structures; but what exactly do we mean by Pre-Fab?

A prefabricated structure is a structure which has components manufactured in an off-site industrial facility. They are sometimes referred to as factory-made or modular structures, although there are some notable differences. In a prefab structure, components are made in-house and transported in a flat-pack form lowering logistical costs, whereas modular homes have entire sections of the given structure built off-site. By opting for Prefab; human error, waste, time, energy & costs are significantly reduced allowing for efficient construction.

Finish Profiles has perfected pre-fabricated building solutions through extensive R&D. The company's overwhelming experience, accumulating since 1978, allows for high quality precision-based construction. Our international presence in over 16 countries, allows for local culture to be understood. Our India Chapter was founded in January 2012 and has been operational since October 2012 based in Haryana.

The perfected Dutch steel technology facilitates record production & erecting time for the structures we build. While Finish Profiles caters to all types of clients, seeking pre-fabricated solutions, it also supplies high quality components to enhance the building process of Construction Companies or individuals looking to construct using conventional methods.

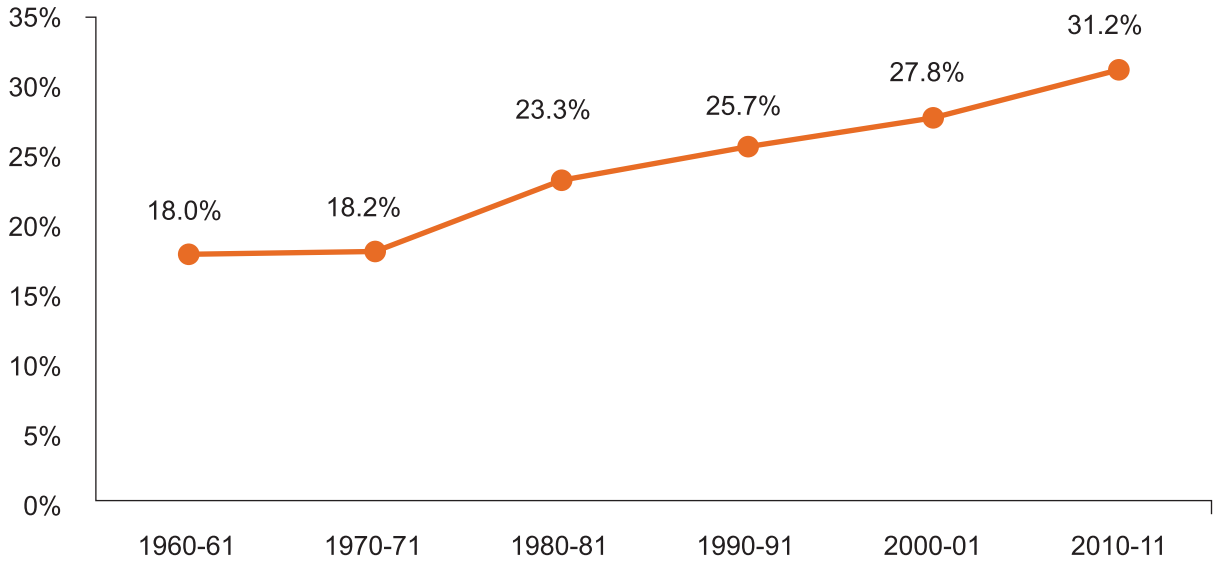
The vast variety of structures we make cover everything from commercial properties, mass housing projects, emergency shelters, multi-purpose halls to Agricultural or Industrial sheds. We, here at Finish Profiles, believe in efficient construction, and use technology to make sure we can deliver just that.

India's housing predicament makes for prime candidacy relevant to Pre-Fab solutions. 'By 2050, 900 million people will be added to Indian cities. The rapid pace of urbanization owing to the rural–urban migration is putting a strain on the urban infrastructure in these cities. As urban development takes place, a growing concern for India's urban planners is the massive urban housing shortage plaguing the country. The shortage, prominent within the EWS (economically weaker sections) and LIG (lower income groups), is estimated at 18.78 million

households in 2012.

A thrust on encouraging private sector participation in affordable housing, traditionally the domain of the Government, could provide the answer to India's urban housing predicament. But as things stand, affordable housing remains a challenging proposition for developers. Issues continue to persist in land availability and pricing, project approval processes and other areas, which make low cost housing projects uneconomical for private developers.

Urbanization Growth in India



Source: Census of India 2011

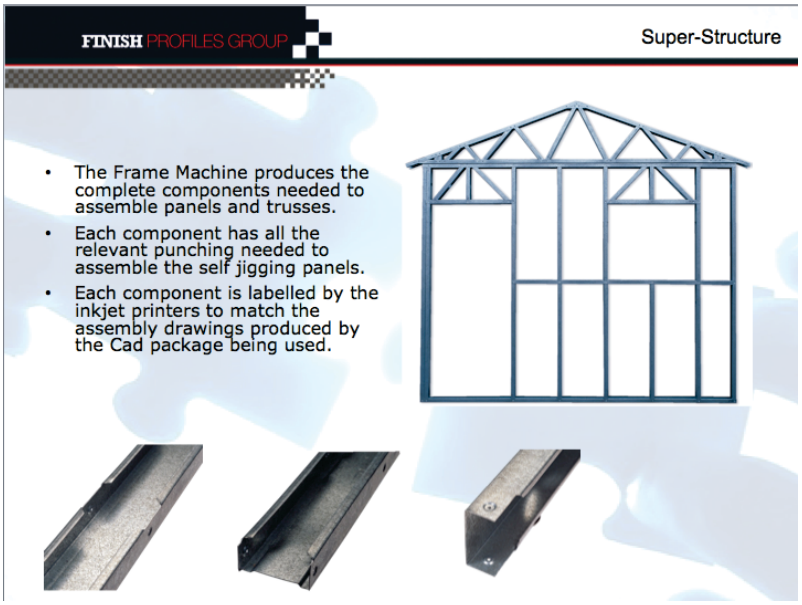
(Image 1)

Making affordable housing work in India necessitates the active involvement of all the stakeholders concerned. Radical thinking on the part of the Government can provide the much-needed fillip to affordable housing development in the country. Steps such as establishment of a single window clearance system, formulation of innovative micro mortgage lending models and tax subsidies would encourage private sector involvement. The developers, on their part, need to adopt innovative and low-cost technologies which could enable them to deliver affordable houses quickly and cost–effectively.[1]

Conventional construction methods are simply too slow and expensive to effectively tackle the enormous housing gaps. This has been proven true, as most mass projects tackling the issues on hand have been stalled or severely delayed due to the inefficiency to the process. The increased competition in conventional construction has also helped establish a trend of tender Under-Cutting, resulting in companies creating margins by using sub-standard materials.

Mindset is one of the major hurdles that Finish Profiles has to over come in India. The overwhelming majorities

1 KPMG



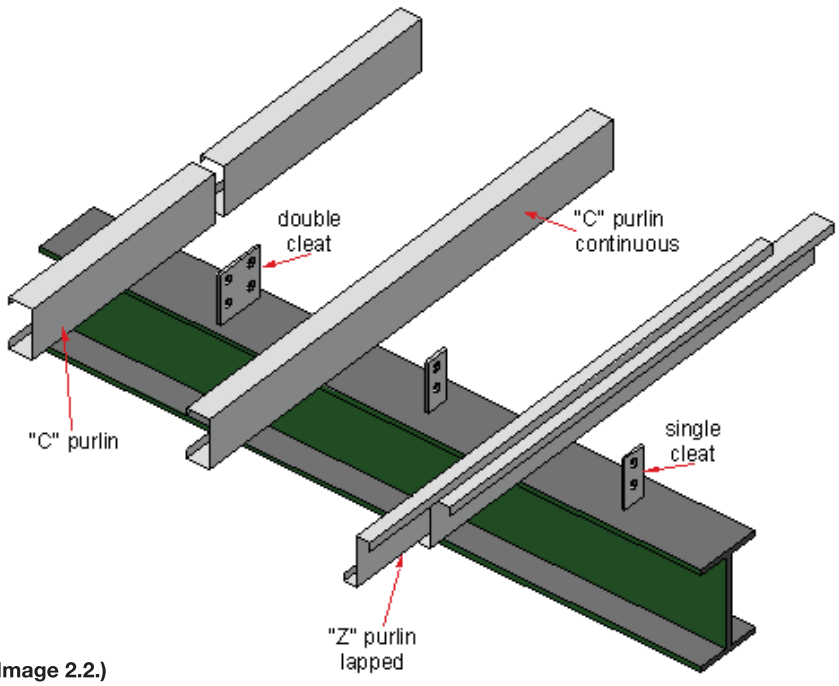
(Image 2.1)

are still under the impression that Pre-Fab only refers to a temporary flimsy structure, which serves its short-term purpose. Pre-Fab is associated with tacky looking shed structures of sorts. This is one of the main areas Finish Profiles differs from 'Pre-Fab' companies in India; aesthetics of a given structure are equally as important as strength, quality & pricing. We build structures that are attractive to live in, while maintaining pricing for Low- Cost Solutions.

The Karnataka Police Housing Corporation has seen the benefit of our construction methods; Finish Profiles completing a police housing solution for them in just 13days. (G+1 Police Constables' model Flat built by Finish Profiles India @ KSPHC's Fast Track Construction Technology Park, Adugodi, Bangalore.

The main structure, also referred to as the super structure, essentially the skeleton for the structure is made up of high quality Light Gauge Steel as shown in image 2.1. More specifically they are a series of Galvanized C&Z sections combined: Galvanized C/Z purlins are made of high quality galvanized steel strip, which is characterized by its resistance to corrosion. The lengths of purlins can be customised according to the order. A wide range of thickness' and sizes are available. Galvanized Z purlins have been continuously popular among builders, due to their long life spans, trumped by the fact that they require no painting in order to be protected from corrosion. C/Z-purlins are most often used when constructing roofs.

However, this system can also have various other applications. The form of the purlins and the varying flange-width allows you to realize an overlap as shown in image 2.2.

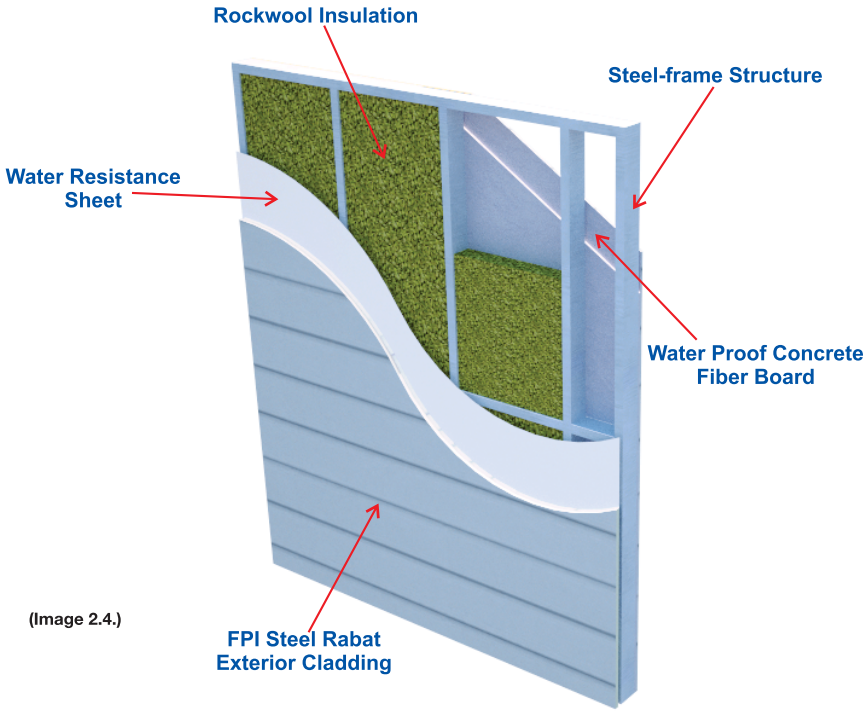


(Image 2.2.)

(Image 2.3.)

The image above shows the various stages while erecting the Police house. The first stage thus shows the LGS being installed on the concrete plinth. The second image shows the LGS now installed on the second floor, while simultaneously concrete fibre board is installed on the ground floor downstairs. The third image showing the cladding being put to the front of the structure as well as the installation of the relevant roof system. The final stage shows Cladding to the back & our scope of work complete.

The wall system installed in the police house is shown in image 2.4. below.



(Image 2.4.)

The exterior is made of our specialized Rabat cladding, which gives a rich wood finish. The material is actually made of high quality pre-painted galvanized sheet. This is followed by a water resistant plastic sheet to prevent moisture from entering the wall system. Insulation is provided by Rockwool which proves cheap and effective. The interior portion is fitted with waterproof concrete fiber board. Finish Profiles has various solutions for wall systems and allows client specification to meet their needs and price. The four main variables are, Mass of the wall, Fire resistance, DB levels or Acoustic Values & wall thickness

While constructing a house from scratch is quite straightforward, we also construct on existing conventional structures. This allows a cost-efficient and apt response for building extension and expansion. The lightweight nature of our structures allows this to be built on conventional buildings which may not have been prepared with support for future expansion;

(Image 3)

This project was carried out for the **Karnataka Forest department.** The objective was to build an IT department behind their official Government Building. The challenge at hand was to create this on top of an existing garage block. This was converted in 10 days.

While the structure boasts quick construction times, it also shows the high quality finish, we strongly believe in. The flexible, robust & light weight nature of the structure makes it ideal for Indian conditions. Earthquakes, extreme climate conditions & lack of maintenance, hence common conditions in India, left the steel based structures unfazed.

The Image below shows the comparison between traditional construction methods & that of Finish Profiles. As you can see our carbon footprint is reduced by 80%. There is a significant improvement in the health implications for the various stake-holders; workers to residents around the relevant site.

The technology is apt for mass scale production; mitigating human error through an atomized manufacturing system. Our products have been successfully implemented around the world, allowing for a system, which is tried and tested. Due to vast size of India, are solutions for mass scale project in India also include setting-up a plant close to the relevant site, further limiting logistical costs and carbon emissions.

We here at Finish Profiles believe in constantly growing. Our claim is not that our steel based Pre-Fab technology is the better then a concrete based Pre-Fab solution or any other; often combining various technologies lead to the best results. We would simply state that if there is intent to tackle the housing issues facing India, Pre-Fab is the only viable solution.

Traditional house			Veerhuis	Environment	Energy	Health	Cost	Climate
N		Wood	Less	X				
N		Water	Less	X				
N	Radon	Bricks	None	X		X		
N	Allergles	Cement	Less	X		X		
N	Accidents	Transport	Less		X	X	X	
N		Foundation	Lighter		X		X	
YES		Heavy Machinery	No		X		X	
N		Construction Time	5x faster		X		X	
N		Energy Construction	-60%		X		X	X
N		Natural Resources	Less	X				
N		Internal Materials	N					
N		Maintenance	Less		X		X	
N		Co2 Emission	Less					X
-		Light Weight	+++		X		X	
+	URTI	Allergles	No			X	X	
-	800 death/year	Asbestos	None			X	X	
+		Cancer	No			X	X	
+	800 death/year	Radon	None			X	X	
?	Cancer	Ozone	None			X		X
N		LTA's	Less			X	X	
++		MSD	Less				X	
++	Lungcancer	DUST	None				X	
+	URTI	Fungi	Less		X		X	
+	URTI	Mould	Less		X		X	
N		Cheaper	Yes				X	
N		Lifespan	N+				X	
N		Strength	Better				X	
NO		Simplicity	Yes				X	
N		Demolition	Easy		X		X	
+++		Solid Waste	Less	X	X		X	
expensive		Passive House	Easy					
NO		Fire Retrading	Yes					
40%		Reuse / Recycling	95%	X			X	X
+		Globle Use Possible	+					
No		Earthquake Ressistant	yes			X	X	
+		Soloution Globle Slums	+++			X		
+		Local Production Meterials	+					
+		Post Disaster Reconstruction	+++					
+		millennium Development Goals	+++			X		X

MDG = Millennium Development Goals
URTI = Upper Respiratory Tract Infection
MSD = Lost Time Accidents
N = Normal

KSPHC 2 PC Model Flats Built Using Aerocon panels

Shri. Sudhakar,

Director, S&G Metal Building Solutions, Bangalore

We are one among the fast track construction companies with a desire to catch up the speed of the fast moving generation, with an effective cost & time saving construction, using Aerocon panels & metal structure.

The concept of prefab structures has fast been catching on in India among all entities, from builders to architects to industrial houses are waking up to the advantages and quick turnaround time that prefab structures offer them.

Aerocon panels are a result of commitment to create greener buildings. , Aerocon panels are slim, lightweight wall panels that perfectly substitute plasterboard, plywood, particleboard and brick walls because of their sheer strength. Their low weight, ductility, fire and moisture-resistance properties make them hardy survivors of climatic and accidental disasters. Being pre-fabricated, they are also easy to install and reduce construction time by 80%.

Aerocon Panels are ideal as walls, partitions, mezzanine flooring and prefab structures for low cost housing. Aerocon Panels are bringing about a revolution in building construction, making it Go-Green, sturdy, quick and cost-effective.

What it's made of?

An aerocon panel is a sandwiched panel of two fiber reinforced cemenr sheets enclosing a light weight concrete core composed of Portland cement, binders and a mix of silacaceous and micaceous material aggregate.

Advantages:

Fast Track Construction:

Tongue and Groove joining system allows faster construction

Easy workability, no special tools required

Light weight panels allow easy handling and erection

Factory cured panels eliminate need for on-site curing

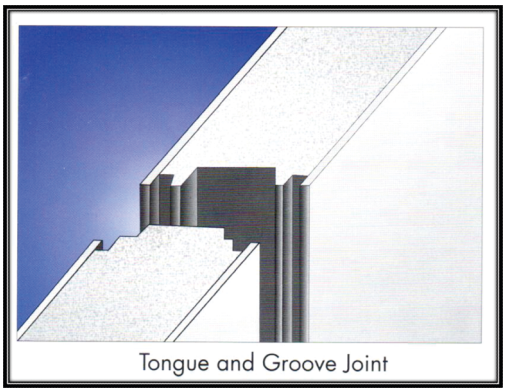
Re-locatable complete structure can be dismantled and re-erected.

Why Arecon?

A Structural study & analysis of Aerocon Prefab Structure in the aftermath of Earthquake by an expert of JNTU, attributed the following product features in support of its safety record :

- Light Weight Aerocon generates minimal inertia force & therefore contributes to greater stability.
- The Innate strength of aerocon Panel Helps withstand Tension, compression, shear& flexure.

- Aerocon's Unique Tongue &Groove System permits local adjustments for shock absorption.


Tongue and Groove Joint

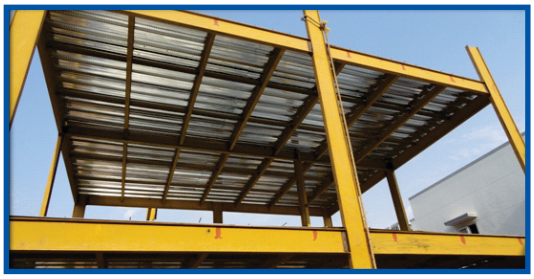
Disadvantages

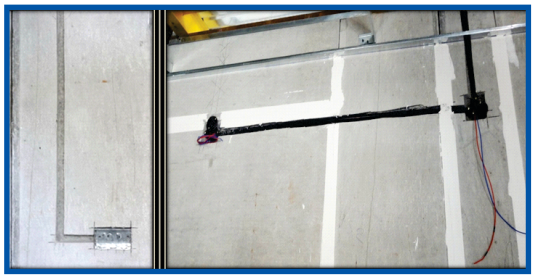
- Prior Planning required to construct additional floors, cannot construct on existing building..
- Has limitation of withstanding a hanging load of 150kgs / Sq.mt. compared to RCC walls.
- Panel thickness cannot be reduced or increased to desired size on & after execution.

Build Process at the KSPHC Fast Track Construction Technology Park

Traditional civil works up to plinth...

Pre-fab Steel structure


Roof Slab deck sheeting with concrete.


Grooves can be engraves for electrical / Plumbing

MiiHome Building System

Shri.Mark Winfield,
CEO & Director
Pearls MiiHome Pty Ltd, Australia

Pearls MiiHome is the proactive Australian arm of Indian corporate behemoth Pearls Global, and was created to pursue development and business opportunities throughout Australia, Asia and the Pacific.

Pearls MiiHome is the inventor and owner of the internationally patented MiiHome Building System, a unique first world technology underpinning these ready made homes.

The technology, build process and advantages:

Panel System-A 21ST CENTURY BUILDING SYSTEM

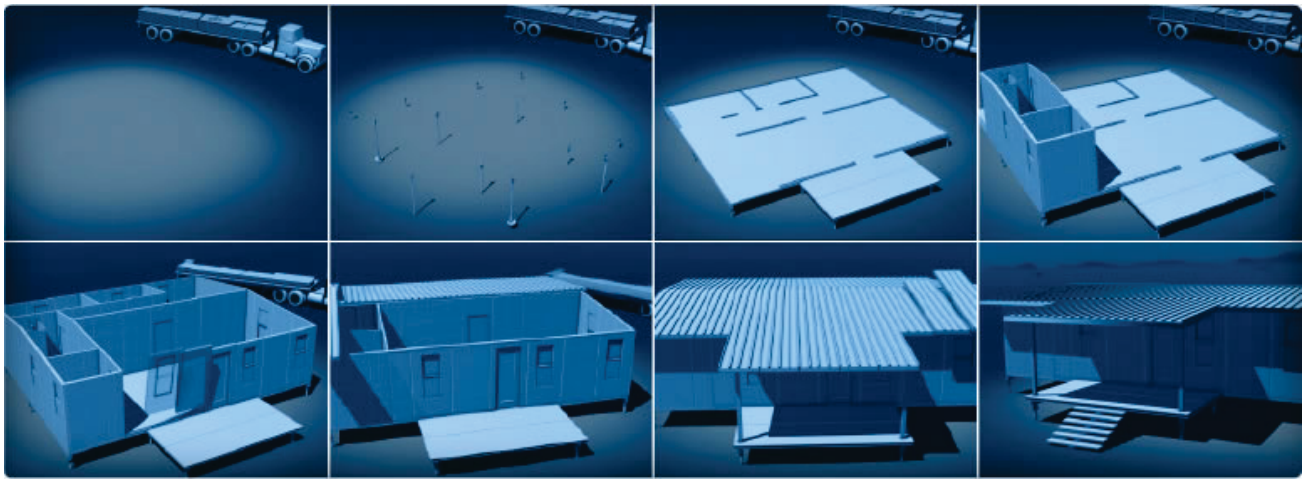
When it's finished, an EPS panel based technology construction looks and feels like traditional construction. But under the surface things are radically different.

The innovation lies in a unique system of panels, composed of an expanded polystyrene core encased in an innovative steel lining. These fasten together to create a seamless, high performance structural envelope that replaces traditional frames, trusses, brickwork, plasterboard and insulation. Engineered lintels are incorporated in the panels to take roof loads where required. Windows and doorframes – complete with architraves and reveals – are pre-fitted at the factory.

The roof and ceiling panels feature a high tensile COLORBOND steel exterior, and a pre-painted COLORBOND steel underside. A slip joint in each wall panel, as well as top and bottom plate sections and integrated joint sections, completes the structural system. Fastened like this the walls and ceilings are perfectly straight and are resistant to bowing shrinkage and weathering.

The build process

1. The key components of a building arrive on site packaged according to size and construction sequence.
2. The building site is prepared and a concrete slab poured or screw piers put in place.
3. The floor plan is laid out directly onto the slab, and the internal floor channels installed.
4. Prefabricated modules, such as kitchens and bathrooms complete with all appliances and fittings, can be 'dropped in' during construction.
5. The patented fastening system locks the walls into place. The wall panels are complete with windows and doors already assembled at the factory.
6. Plumbing and electrical services are roughed in using service cores and conduit channels within the panels. A wire loom can be used to accelerate the process.
7. The roof panels are secured to the walls using special steel sections, fixings and fasteners. Traditional fascia and gutters and ridge flashings complete the roof detail.
8. Walls are finished by setting each joint and corner and applying a base coat ready for painting or rendering.



Pictorial representation of the Build Process

Advantages:

- Engineering
- Design
- Energy Efficiency
- Sustain ability

Engineering

It's difficult to imagine a more robust building system than Pearls MiiHome, or one that provides a safer living environment for occupants in any kind of extreme event. The inherent sturdiness and durability of MiiHome building system makes it superior to traditional building methods and provides a number of critical intrinsic benefits:

- A C2 Wind rating, placing it in a high resistance category.
- Earthquake resistance, such that there would be no comprehensive collapse during seismic activity.
- Flood resistance equivalent to a C2 lateral loading of water flow.
- Fire resistance, as there are no components in the structure exposed to combustion.
- Resistance to termites and other pests.

Design

From an architectural perspective, MiiHome offers a high degree of flexibility in floor plan design and aesthetic treatment. Exciting lifestyle and building features can be included in a MiiHome building without the need for extensive and costly engineering (which would normally be required in traditional building methods).

Designers can maximize the use of space, cross ventilation, natural lighting, aspect, and other location-specific benefits. It's even possible to literally 'grow' homes with their owners, by designing and attaching new prefabricated rooms as their accommodation needs evolve over time.

Energy Efficiency

The Pearls MiiHome building system delivers exceptional thermal performance from the unique insulation properties of its structural panels. It delivers a star rating of up to 9.5 which improves comfort levels and reduces the need for heating and cooling, and achieves this exceptional star rating under a full range of climate scenarios.

This performance is around 35% better than comparative building methods like brick and cladding. And it's even higher where double-glazing and other options are utilized.

Sustainability

This Pearls MiiHome building system is a breakthrough in the quest for widespread implementation of attractive, comfortable, affordable, and healthy, zero-carbon homes. Builders involved in recent trials reported that on-site waste for a MiiHome project was only half that of a conventional construction site.

MiiHome's unique fastening system means dwellings can be built with minimal adhesives and sealants, reducing exposure to toxic and volatile organic compounds. Which means a MiiHome is healthier to build, and healthier to live in. Research indicates that the materials themselves have a life expectancy of at least 50 years. And when they're no longer needed, dwellings can be easily deconstructed, and the panels re-used elsewhere. Or they can be delaminated for recycling of both the steel and the insulation components.

The Pilot Model Flats:

Pearls MiiHome in collaboration with KSPHC took up the construction of two Model Fire officers' quarters at Rajajinagar during Oct 2011 and two Model Police Constable Quarters at Adugodi, Bangalore and subsequently Adugodi Model Police Constables' quarters in G+1 configuration was constructed with the same technology at the **KSPHC Fast Track Construction Technology Park**

The Build Process at the KSPHC Fast Track Construction Technology Park

Day 1

Day 5

Day 11

Day 15

Fastest Construction ever! And yet of high quality!

This is probably one of the fastest construction processes in this country and we are very excited to herald this revolutionary change in the construction field in India

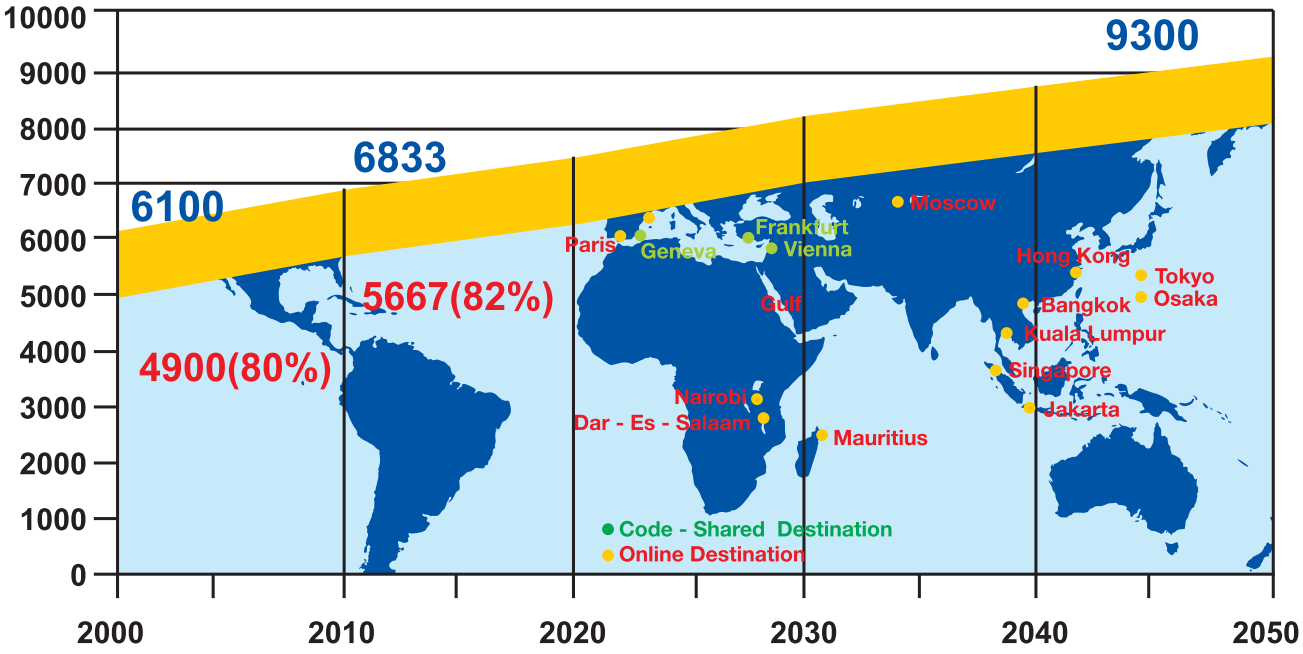
THEME : 2

Sustainability – The Overarching Dimension in Built Environment

V. Suresh
Director – HIRCO Project Companies
Vice Chairman – National Building Code of India
Former CMD HUDCO

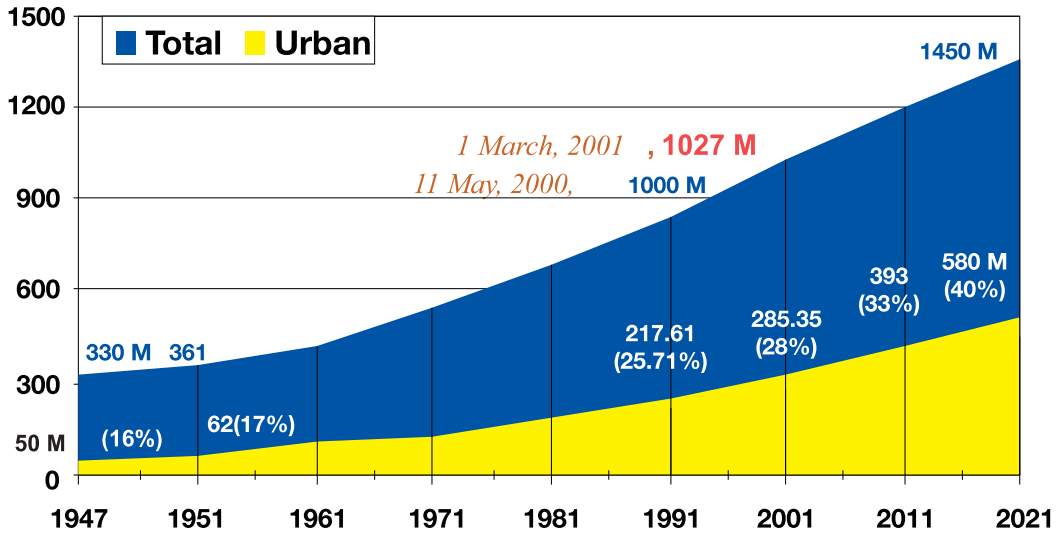
World Population Trends

Population in developing and lesser developed countries to be 88% of total population by 2050



Source: UN Population Division; WORLD POPULATION PROSPECTS
Population Reference Bureau: WORLD POPULATION DATA

Urbanisation Scenario in India



Urban Explosion

- Census of India 2011 has announced India's population at 121 crores (more than projection given earlier
- We are growing at the rate of 2 crores per year!
- India's Urban population will double from 28 crores in 2001 to 58 crores in 2021
- Along with that the Challenging Development needs

Massive Housing and Infrastructure Needs

- With increasing population, Urbanization is increasing

  from 16% in 1947 – 50 millions

  27.8% in 2001 – 280 millions

  likely to be 40%+ in 2021 – 580 millions

- Indian Cities (5161 – 2001) are growing (7315 – 2011) with increasing challenges for

- Housing
- Infrastructure

Cities and Growth Engines

- Recognized as cities make an important contribution to social and economic development at national and local levels.
- cities are important engines of economic growth – 70% GDP
- cities absorb two-thirds of the population growth
- cities offer significant economies of scale in the provision of jobs, housing and services
- cities are important centres of productivity and social advancement

Affordable Housing for All

- Affordable Housing for All is an integral part of the National Urban Housing & Habitat Policy, 2007.

- Housing for Economically Weaker Sections (EWS) is a critical feature of the Government's policy of social inclusion.
- The Government seeks to push partnerships with the cooperative sector, labour housing sector, employee welfare housing organisation, employer housing and the private sector.

National Urban Housing and Habitat Policy 2007

Salient Features

- Goal of the Policy is on Affordable Housing for all with special emphasis on the urban poor.
- Strategy framework is multiple partnership of States with various stakeholders, cooperatives, employee welfare housing organisations, private sector, state parastals.
- Special emphasis has been laid on SC/ST/BC/Minorities, empowerment of women within the ambit of the urban poor.
- Symbiotic development of rural and urban areas in line with the objectives of the 74th Constitution Amendment Act.
- Emphasis on urban planning and increased supply of land, use of spatial incentives like additional Floor Area Ratio (FAR), Transferable Development Rights, etc.
- Optimal use of available resources. 10-15% of land in every new public/private housing projects or 20-25% FAR, whichever is greater to be reserved for EWS/LIG Housing through appropriate legal stipulation and spatial incentives.
- Innovative fiscal instruments and correctly targeted financial concessions and beneficiary led housing development.
- Encouraging Integrated townships and Special Economic Zones.

Salient Features for Action

- States to be advised to develop 10 years perspective Policy & Action Plans for housing of EWS/LIG.
- Policy gives primacy to provision of shelter to urban poor at their present location or near their work place.
- Approach will be In-situ slum rehabilitation. Relocation will be considered only in specific cases.
- Micro finance institutions to be promoted at state level to expedite flow of finances to urban poor.
- Model municipal laws to be prepared by the Central Government.

State Housing and Habitat Policies advocate Affordable Housing

The State Housing and Habitat Policies of Kerala, Karnataka, Maharashtra, Tamil Nadu, Rajasthan, Punjab and Andhra Pradesh strongly advocate the promotion of affordable housing in general and social housing needs for EWS and LIG in particular

Housing Delivery Options

- Government Sector
- Public Sector (Housing Board, Development Authorities, etc.)
- Co-operative Sector
- Corporate Sector
- Private Sector
- Individual Sector

Housing Delivery Options

Only 1 out of 10 houses generated through Government and Public Sector initiatives

There is an imminent need for strengthening and expanding housing through other options including partnership modes – Why?

Increased Emphasis on Partnership Modes for Housing and Urban Infrastructure

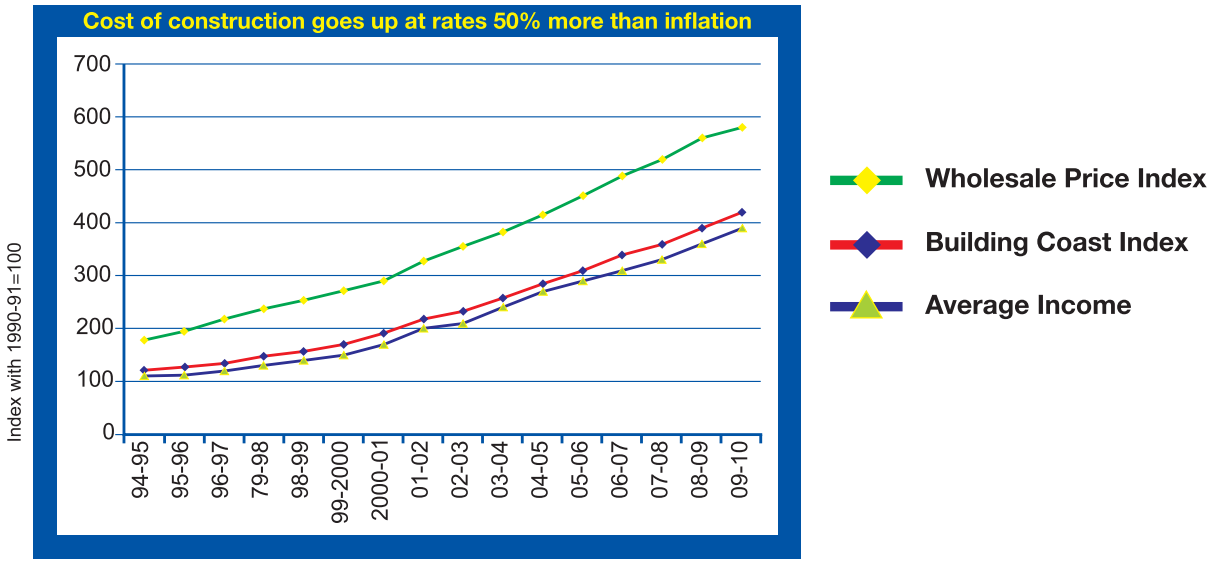
The imperative need for Private Sector Participation for:

- Extended resources
- State-of-the-art technologies
- Efficient project management / maintenance

Reform Thrust Areas Land

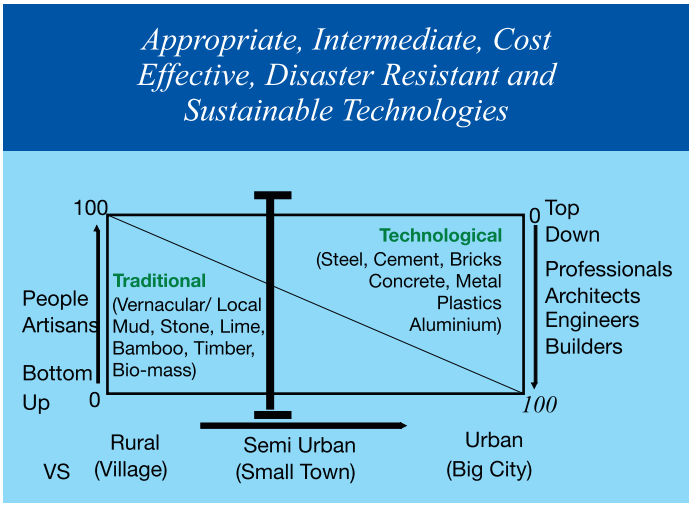
- Large / easy availability of land
- In housing costs, land / developed land account for 10 to 95 % of cost depending on small town to Metropolitan – Mega cities – the higher level has to come down
- This should be around 10-40% and the balance for building construction costs
- 70% of the Residential Urban Land used by MIG & HIG (30%) and only 30% of Land for EWS & LIG (70%)
- Land development rules, town planning norms, planning standards, development country rules, building byelaws and regulations need to be revamped
- In line with National Building Code 2005
- For optimum and efficient use to land as a precious resource
  - Low Rise High Density
  - Plotted Vs Group Housing
  - Cluster Planning Vs Grid Iron layout
- Land bank for EWS/LIG
- Land bank for Shelter-less category
- Land Records - Torrens systems / GIS System Project

Status of Construction Industry



Rising Cost of Construction

- Cost of Land going up by 15 to 20% per year
- Cost of Steel up by Rs.10000 / ton
- Cost of Cement up by Rs.800 / ton
- Excepting Plywood all material costs up
- Labour cost up by 20% over the last 3 years
- Cost of Construction up by 15% to 20%
- How do we cope with this?
- More so for the EWS, LIG and even MIG?



Need for Sustainable Building Technologies

- Therefore there is a need for using cost effective and sustainable housing and building technologies which are:
  - Strong
  - Durable
  - Safe
  - Functional
  - Aesthetic
  - And Affordable

Strategy for Sustainable Development

- Technologies for Building Materials to be :
  - Environment Friendly
  - Ecologically Appropriate
  - Energy Saving
  - Economical in Cost

Techno - Legal Regime for Disaster Mitigation:

- Disaster - Earth Quake
  Flooding
  Cyclone
  Landslide
  Fire
- Destruction to properties – life – assets – more so of the poor and marginalised
- All efforts so far have been Post-Disaster Response (PDR)
- What is needed is Pre- Disaster Mitigation (PDM)
- Rs.1 spend on PDM saves Rs. 10 on PDR

Imperatives for Promoting Safer Buildings/ Construction

- With a view to ensure that the massive financial resource investments for housing and other public asset buildings and infrastructure are safe, strong, durable and perform well during life cycle, it is essential that these are:

- Flood protected
- Cyclone / typhoon resistant
- Earth Quake resistant
- Land slide protected
- Sea erosion and tsunami protected

Adopting sustainable environmental practices

- **Reduce**
  - Use of light weight structure by design and higher usage of hollow blocks
  - Reduce wall area with wider windows improving WWR i.e. 'Window to Wall' Ratio (Increasing Day light factor)
  - Reduce Carbon Footprint using low embodied energy materials with dependence on local materials
- **Re-use**
  - Zero percent disposal of construction debris out of the site and reuse for infrastructure works
  - Converting bio-degradable organic waste into manure for landscape applications
  - Rainwater Harvesting and using to meet domestic and flushing needs
- **Recycle**
  - **Crusher Plant:** Recycling of excavated boulders through crusher plant for all aggregates and sand
  - **Sewage Treatment Plant:** 100% recycling of waste water (sewage and sullage) from Workers' Facility area using it for construction, flushing and garden irrigation and 100% recycling plant designed for post occupancy

Sustainable Site Management

- Erosion and Sedimentation Control
- Design to include site features, existing tree protection, design according to contour levels
- Landscaping with 70 % native species effect reduced Heat Island Effect
- Wheel washing
- Top Soil Conservation
- Designated areas for activities, Consolidated service corridors

Sustainable Water Management

- No Anthropogenic Discharge : Sewage Treated Water Recycling and reusing
- With **45%** potable water savings
- Flushing system to reuse water from STP
- Landscaping with 75 % native species to reduce water demand
- Roof top rain water harvesting
- Water Treatment Plant, Need based
- Low Flow Water Fixtures

Township Development Features

Waste Management – Construction and Occupancy

- Use of local crushed sand instead of river sand
- Proper segregation of waste at source for recycling
  - Solid waste

- Reinforcement, empty bags, wood, cartons- waste
- Bio degradable waste
- Other non bio degradable Waste
- Bio medical Waste.

Built Environment and Regulatory Frame Work

Built around the philosophy of creating and maintaining Safe Built Environment for people and property by ensuring:

Structural Safety

Health Safety

Fire Safety

Construction Safety

Electric Safety

Environment Safety

Life Safety

Public Safety

ENFORCEMENT

Introducing Techno-legal regime through provisions in building regulatory media and its application during the stages of

- EIA Clearance
- Building Permit
- Development Permit
- Supervision Control
- Completion Certificate
- Occupancy Permit
- Pre Certified and Certified Green Building Ratings
- Periodic Renewal Certificate

Right Professionals

To mandatorily associate the right level of professionals (architects, engineers, structural engineers, supervisors, town planners, urban designers, landscape architect, engineers for utility services and the green building consultants and energy simulation specialists) of degree / diploma or certificate level depending on

- The nature of building (type, size, area, height)
- The location (mega /metro city, medium/small town and villages)

Beyond Safety Consideration is the Green Movement

While the present Regulatory frame work deal with Built Environment for the three dimensional spaces and connected spatial development, these do not touch on:

- Environment
- Ecology
- Energy Consumption
- Quality of Life
- Sustainable Development

Approach to Sustainability

- Need for Sustainable Development
- Elements of Sustainability
- Life Cycle Sustenance
- Technology Options
- Energy Efficient Design and Processes
- Reduced Embodied and Operational Energy
- Integrated Water Management
- Operation and Maintenance of Services
- Monitoring Compliances
- Corporate Governance
- Disaster Preparedness

Salient Features

Bottom Up Approach

Covers Local microclimatic conditions, minimum levels of Sustenance, more local technological options

Vs

Top Down

Covers Energy Savings , high technology interventions, more expert advises

Life Cycle Sustenance - Project

All level Techno Commercial Evaluations shall have

- Designing
- Sourcing
- Building
- Operating
- Decommissioning
- Reusing
- Disposing

associated costs **Vs** Current General Industry Trend of Techno Commercial Evaluations

Technology Options

- Waste to Wealth like Agricultural, Industrial , Bio-wastes
- Indigenous Environment Friendly Technologies
- Cost and Time effective work practices
- Encouraging use of Appropriate Technology
- Construction practices suitable to respective climatic zone
- Encourage use of Traditional Technologies, may be blended with Current Technology Practices

Energy Efficient Design and Processes

- Include Climate Responsive Design practises
- Identifying minimum levels of Energy Consumptions
- Reducing dependence on Fossil Fuel Economy
- Increased component of renewable in annual power consumption
- Energy Costing shall include life cycle costing with tangible and non tangible benefits

- Reduce Embodied and Operational Energ

Integrated Water Management

- Include Existing Traditional practises/ water features
- Identifying minimum levels of Water Consumptions
- Integrated and sustainable water management
- Zero Discharge or Net Water Positive projects
- Water conserving adoptable features
- Site specific Rain Water management
- Landscape with native plant species with emphasis on Urban Agricultural practices

Operation and Maintenance of Services

- Documented requirements of O and M
- Monitoring of consumptions
- Awareness building through tenant guidelines and encouragement
- Corporate Governance for CER activity, monitoring and filing compliances status at occupancy stage

Green Legislation – Challenges and Prospects

- While Building Regulatory Frame Work is **MUST DO – MANDATORY**
- Green Building Practices is **GOOD TO DO – RECOMMENDATORY** (Guiding Frame Work)

Green Legislation – Challenges and Prospects

- Do we make it independent Green Legislation

  OR

  - Make it part of;
  - Municipal Corporation Act
  - Town Planning Act
  - Environmental Protection Act
  - Water Conservation Act
  - Pollution Control Act

Green Building and Related Ratings

- **CII – IGBC**
- **TERI – GRIHA**
- **ECO Mark**
- **BEE – ECBC**

These are not legislation backed, but cover the norms for evaluation of projects for sustainability.

The recognition by Government for such ratings can bring mandatory support like in Germany, Israel, UK and China

The Way Forward

- New Chapter 11 of National Building Code of India 2005 is covering Green Building initiatives and Sustainable Development Principles as part of NBC
- Once this comes out and is adopted by State Governments, Local Bodies, Planning and Development Authorities, Housing Boards, Police Housing Corporations, Construction Departments, New Town Corporations, Automatic implementation take place

Towards Safe, Sustainable and Green built Environment !

Mr. Vasudevan Suresh is a Civil Engineer from Anna University (College of Engineering, Guindy, Chennai) with over 48 years of professional experience in the Housing, Infrastructure, Real Estate, Urban Development and Built Environment sectors.

Has worked in Tamil Nadu Public Works Department (1 ½ years) and later in Bureau of Indian Standards (12 ½ years) and was directly associated with the formulation of leading National Standards and Codes and National Building Code and is Vice Chairman, NBC 2005, and Chairman, Housing Sectional Committee of BIS.

Served HUDCO in various capacities for 23 ½ years and was CMD, till June 2002, during which period HUDCO registered all-round growth in housing, infrastructure development, appropriate technology applications including establishing Housing Retail Finance, National Network of Building Centres, Disaster Mitigation and Rehabilitation Projects and capacity building programmes which has been received well within country and abroad. He was directly involved in HUDCO Techno-Financial assistance and direct implementation projects for Latur, Uttarkashi, Chamoli and Gujarat Earthquakes as well as Orissa Cyclone.

V Suresh has worked in various Government of India Expert Groups on Housing, Urban Development, Building Technologies, Disaster Mitigation and Sustainable Development. Was Chairman, Task Forces for Orissa Cyclone and Chamoli Earthquake. He was Member of Government of India Technical Advisory Group on Real Estate / Housing Price Indices.

He was Chairman of Government of Kerala Task Force on Housing dealing with Kerala Housing & Habitat Policy and Member of Rajasthan Government Committee on State Urban Housing and Habitat Policy and Member of Government of India National Housing Policy Group on Housing Finance.

V Suresh was President, Indian Buildings Congress (IBC), President, National Real Estate Development Council (NAREDCO), Vice President, All India Housing Development Association (AIHDA) and Vice Chairman, Construction Industry Development Council (CIDC).

V Suresh is member of CII National Committee of Real Estate & Housing, member of Indian Merchants' Chamber Housing Committee, Maharashtra Economic Development Council and CREDAI, Co-Chair – CII Task Force on “Cities of the Future”.

He has represented India and worked closely with UNCHS, UNIDO, UNDP, SAARC, ADB, JBIC, KfW, USAID and ADPC on various facets of Sustainable and Safe Human Settlements for different global context initiatives and is Consultant to National and International agencies in Sustainable Human Settlements Development.

He has received 14 distinguished awards for recognition of his work. The leading ones are: 1) “Best Chief Executive of the Year” by the National Foundation of Indian Engineers as part of NAFEN's Annual Corporate Excellence Awards in 1997, 2) “IMM Millennium Top CEO Award for Excellence” in January 2000, 3) “Man of the Decade-Habitat” International Award from Wisitex Foundation in 2000, 4) “Griha Nirman Maharishi Award” instituted by Pune Construction Engineering Research Foundation and Builders' Association of India, Pune in 2000, 5) “Eminent Engineer Award”, “Architectural Engineering Award” and “Engineer of the Year”, by the Institution of Engineers (India) in 1998, 2001 and 2006, and 6) “Industry Doyen” Award as part of CIDC Vishwakarma Awards 2011.

He is a strong advocate of sustainable development and passionately pursues disaster resistant, environment friendly, ecologically appropriate and energy efficient options in built environment and the green building movement. He is working closely with Good Urban Governance initiatives.

V Suresh is now the Director of Project Companies of HIRCO, leading real estate development enterprise dealing with integrated and self-contained townships development.

THEME : 3

How to Finance the Police Housing for Tomorrow

V.P. Baligar, IAS

CMD, HUDCO, New Delhi

1. Friends, I would like to congratulate the Karnataka State Police Housing Corporation for organizing this important conference and inviting to interact with you on the key aspects of housing, i.e. 'Financing for Police Housing'. I am sure this kind of conference dialogues would see more policy initiative for the provision of police housing with the involvement of key stakeholders.

2. As compared to the international figure of approximately 300 men per 1 lakh inhabitants, in India the police ratio per lakh of population is approximately 175(58%) which shows that less number of policemen handling bigger population in India than their counterparts worldwide. The socio-economic and political complexities in India are also much more compared to other countries, which puts additional stress and strain on the police. Therefore, the State, which is supposed to be a model employer, will have to give special attention to the welfare of the police in meeting their basic needs. In my opinion, one of the most important basic needs is **housing** which provides safety and security to the family, and reduces the stress and strain of the duty-bound police personnel.

3. Realizing the importance of police housing, majority of State Governments (21 as on 1st Jan, 2012) have established Police Housing Corporation in our country which are mainly responsible for the construction of staff quarters and Police Office buildings for the police forces. However, there is no provision for construction of houses for their employees for owning the houses.

4. As per the data released by the Bureau of the Police Research & Development of India, while the State Police Force has grown at the rate of 3.24% (from 16.4 lakh as on 1st January, 2011 to 16.93 lakh as on 1st January, 2012), the total number of police quarters available grew by only 1.11% (from 5.40 lakh as on 1st January 2011 to 5.46 lakh as on 1st January, 2012). While 53000 new police personnel were added in one year, only 6000 new houses were built for police by the States in a year. This mean the gap between the housing need and housing supply is widening year on year.

5. **Satisfaction level regarding availability of housing for Police personnel** is also very low. The national average of percent level of satisfaction of family accommodation as on 1st January, 2012 for the Gazetted Officers (GOs) was 25.82%, for the Upper Subordinates, it was 29.08% and 25.22% for lower subordinates. This indicates that the large chunk of police force has to make its own arrangement for accommodation which is not so easy given the archaic rental laws and societal response to police needs.

6. **Police Housing Expenditure:** There is also a decrease in the share of police housing expenditure in the total police expenditure from 5.46% in 2010-11 to 2.13% during 2011-12 at all India level. The share of housing expenditure has come down by 60%. This means the States are not able to spend or not willing to spend on police housing which calls for serious thinking and innovative ways of addressing the problem of financing the police housing shortage in the country.

7. **Conventional sources of financing Police Housing** in India tend to be more dependent on Government support. The main sources of funds includes: grants from the Grants from the State Governments, Central Government funds allocated to the States under the Modernizations of Police Forces (MPF) scheme and loans from financial institutions like HUDCO, LIC etc. The MPF scheme was only up to the year 2009-10. Looking at the housing shortage, even to achieve 50% satisfaction level, you will have to build another 4 lakh housing units. Even modest cost of 10 lakh per house, the requirement of funds will be Rs. 40,000 crores. Its may not be possible for the State and Central Governments to provide such huge police housing in the near future, given the fiscal position and the contending demands from the other sectors.

8. **International Experience:** Housing and Provision of Housing finance for police personnel are receiving increasing policy attention in many countries in the world. Some of the Key examples of programs and funding for police housing worldwide include the following:

   In USA, a "Workforce Housing Fund" has been set up which generally refers to units geared toward a group of earners typically police force, teachers, nurses, and firefighters who on the one hand, do not earn enough to buy or rent out a decent accommodation and on the other hand their income is not too low and hence they get left out by many government programs. Governments, Corporate, Financial Institutions etc contribute to this fund. Police Force in many of the US cities has been accessing this Fund.

   In Washington DC, **'Rental Discounts'**, which offer reduced rent to police officers living in a certain location, are available. The program is named PLUS (Police & Landlords for Unity and Safety) and was created in 1995 to encourage police officers who were renting to become homeowners, thus strengthening community ties.

   - Another program for Police personnel in Washington DC is called **'Home Purchase Program',** one of several Employer-Assisted Housing Programs (EAHP) offered by the city government. There are a series of benefits, including: matching down payment funds of up to $ 1500 ($500 for each $2500 saved by an employee); single-family home mortgage financing; Deferred payment loans of up to $10,000; An income tax credit of $ 2,000 in the tax year of the purchase and the four succeeding tax years; and a property tax credit for five years, declining from 80% in one year to 20% in years four and five.
   - In New Jersey, **'Police and Firefighters Retirement System Mortgage Program'** has been introduced. Under this program, any currently employed police officer or fire fighter at least 1 year creditable service can avail mortgage loan through private lenders to buy a new home or refinance an existing home, The maximum mortgage amount can be up to $417,000 with fixes interest rate of 3.02% (10 Year Treasury bill plus 1%) and maximum repayment period up to 30 years.
   - In Nigeria, a **'Police Mortgage Bank'** has been instituted which is an initiative of the Government of Nigeria and the Federal Bank of Nigeria to build social housing for Police personnel on all the states of the country. This scheme is in collaboration with a foreign partner at would provide 70% of the funding and police officers would contribute the balance of 30% as personnel contributions while the federal Mortgage Bank of Nigeria would assist by providing National Housing Fund loans at affordable interest rates to enable the officers to acquire the houses.

9. Besides the funding constraint due to reduced Governmental support, other major challenge is the availability of land at appropriate locations for police housing. This issue can be and should be addressed by the Housing Boards, Urban Development Authorities and Revenue Department or the State Government by giving preference for police housing in allotment of bulk land.

10. **Issues to be addressed:** International experiences indicate that financing for police housing can come through a number of sources and initiatives. Similarly, we can also attempt to address the issue of Police

Housing shortage by adopting different options.

I The State Government, through the Police Housing Corporation, could construct **houses for the police personnel on 'ownership' basis,** apart form building staff quarters, so that at the end of the service a police person would be a proud owner of a house, Innovative Police Housing Scheme may be devised such as 'Police Social Housing Scheme', 'Rental Discount' Scheme, 'Rent-to-Own' Scheme, etc. HUDCO has designed a 'Rent-to-Own' Scheme which I will discuss later.

ii. **Improve the availability of land:** Government may allot sufficient land in different parts of the state for construction of houses under 'Own your House' scheme for retiring Police personnel and under 'Rent-to-Own' Scheme,

iii. **Innovative Financing** for construction of police housing may be explored. Some of these could be:

a) Establishment of a **'Police Housing Fund'** State or City level which would provide mortgage loan for police housing to lower the cost or homeownership. Government, Corporates, Financial Institutions, etc. could contribute to this fund.

b) Exploring the possibility of setting up of a **'Police Mortgage Bank'** which can provide long term finance for police housing.

c) **Earmarking** certain portion of Police Welfare Fund for housing purpose.

d) Raising resources from the market through **tax-free bond** route;

e) Police Housing projects can also be executed on a **PPP** basis –thus bringing in both finance and project execution expertise. Maharastra has already started experimenting this mode of housing supply.

f) **Long term finance** with attractive interest rates from Financial Institutions like HUDCO, Insurance companies and Banks also can be explored.

11. HUDCO and Police Housing

i HUDCO has been providing loans for construction of not only police housing but also for other non-residential buildings like Police Stations, Police Academy, Police Infrastructure Facilities, Rehabilitation Centers/Schools, Improvement/Additional Facilities for Police Training Colleges. So far, HUDCO has sanctioned 339 schemes in 9 states with a loan amount of 1805.2 crore supporting 71,432 units.

ii. HUDCO has also been offering Consultancy Support for Police Department. Some of the recent consultancy assignments are: Senior Police Officers' Mess in Bangalore, Fire Station +Office complex and allied residential complex in Bangalore (KSPHC); corporate office, Broadway Road, Cantonment-office complex for KSPHC, Bangalore. A concept has been submitted to KSPHC for model police station at Bangalore and a MOU has been signed for extending HUDCO's guidance to 'OWN YOUR OWN HOME' programme of KSPHC.

12. 'Rent-to-Own' Scheme

i. A recent report by Bankwest of Australia (3rd key Worker Affordability Report. Bankwest Financial Indicator Series, March 2011, Australia) indicates that housing affordability was deteriorating for key workers (nurses, teachers, police officers, etc.) with only 5% to 20% able to afford the median priced house in the larger urban areas in Australia. In other countries such as New Zealand, UK, USA, Canada and Ireland, housing affordability is also low.

ii. Similar is the case in our country as well. A significant percentage of employees, especially Constables, Head Constables and ASIs, can't afford housing on ownership basis on their own. They need to be facilitated towards owning a house.

iii. As a part of the same, HUDCO has introduces a new innovative Scheme called **'Rent-to-Own' Scheme,** which is applicable to all public sector institutions/organizations interested in facilitating their employees to own a house during their career. 'Rent-to-Own' Scheme is an important instrument for provision of housing services at affordable prices. This scheme was discussed during an interaction meet organized by HUDCO with the chief executives of State Police Housing Corporations and State Road Transport Corporations at Delhi on 23rd January, 2013 and was well received by the participants.

iv. This **'Rent-to-Own' Scheme** envisages facilitating various Public Institutions by taking loan from HUDCO on behalf of its employees which can increase their satisfaction level without really spending its own resources. The scheme would enable the employees to own a house over time through the support of their institutions.

v. As per this Scheme, the Police Housing Corporations would build the houses and would give on rent-cum-ownership basis to the employees. The agency would recover the amount through EMI which would be HRA of the employee plus some additional deduction from salary. Ownership would be transferred after the entire loan is paid or at the time of retirement benefits. For availing loan from HUDCO, Government guarantee is not needed if title deed is deposited /mortgaged to HUDCO. This scheme will surely enhance the satisfaction level of the Police personnel.

vi. The benefits of the scheme are manifold: (a) provides security of tenure by owning your own property; (b) protection against possibility of large increases in rental as well as property process; (c) enables to build an asset- the beneficiary's equity build up month on month in the property; (d) In case of not able to pay for property or rent, could withdraw from the scheme; and (e) fair pricing of the housing units.

vii. I would like to mention here that lending to State Police Housing Corporations is a key focus area of HUDCO. With our favourable lending norms with competitive interest rates and longer repayment period, I am sure State Police Housing Corporations would find it attractive to seek financial assistance from HUDCO. I take this opportunity to invite your Corporations to avail the loan facilities from HUDCO for **'Rent-to-Own'** Scheme as well as other schemes of Police Housing and I assure full support of HUDCO in this direction.

13. Before closing my address, I would like to quote a famous saying: **'Failing to Plan is Planning to Fail'** and I am sure all of you would not like to fail and would be planning for your personnel to succeed.

Sri.V.P.Baligar, An officer of the 1980 batch of the Indian Administrative Services of Karnataka cadre. Shri V P Baligar, assumed the charge of Chairman & Managing Director of Housing & Urban Development Corporation Ltd (HUDCO, a Government of India Enterprise in April 2011. Before Joining HUDCO, he has been the Principal Secretary, Commerce & Industries Department of Govt. of Karnataka since November 2009. He obtained first rank in B.Tech (Civil Engineering) from I.I.T. Bombay in 1978 and MBA in 1995 from Southern Cross University, Australia.

In his distinguished career, Shri Baligar has held a number of key posts in his parent State which include Principal Secretary to Chief Minister, Infrastructure Development Dept., Rural Development & Panchayat Raj Dept., CMD, Commissioner for Public Instruction, Karnataka Power Transmission Corpn., Chief Secretary, District Local Body, Deputy Commissioner, Bangalore City Corporation and Administrator of six municipal bodies. As a keen administrator, Shri Baligar held senior positions with the Government of India and Govt. of Karnataka. He has participated in number of Conferences and Seminars at National and International levels.

Some of his major achievements in his career has been implementing Mid-day meal scheme for 50 lakhs school Children, Power Sector Reforms, appointing a Schedule caste priest in a temple, implementing 73rdConstitutional amendment resulting in effective decentralization of rural local bodies, attracting investment in Commerce & Industries in Karnataka State.

Shri. Lalrokhuma Pachau, IPS

DG&IGP, Karnataka

Excerpts from the welcome address

Ladies and Gentlemen: these two days of All India Police Housing Conference is coming to an end with this Valedictory function. As a part of the conference, Hon'ble Home Minister of Karnataka has inaugurated yesterday the Fast Track Construction Technology Park at Adugodi where KSPHC has constructed 5 residential units using 5 different innovative technologies. During the conference, very important themes relating to Police Housing like cost, time and quality-Technology as a solution, Sustainability and Financing of Police Housing have been discussed by the eminent speakers and delegates from all over the country. The discussions and deliberations have enabled us to formulate recommendations and suggestions that will be forwarded to the Government of India through the Bureau of Police Research and Development, New Delhi. I once again welcome all the delegates who have come from different parts of the country to participate in this conference. I welcome other participants from academia, construction industry and other corporations of Government of Karnataka and guests from various departments from Karnataka.

SHRI. LALROKHUMA PACHAU, IPS

DIRECTOR GENERAL AND INSPECTOR GENERAL OF POLICE, KARNATAKA STATE, BANGALORE

Shri. Lalrokhuma Pachau, IPS was born in Mizoram on 1-3-1955 and obtained his BA(Hons) degree in History from Eastern Hill University (NEHU), Shillong. He joined Indian Police Service (IPS) in 1977 and was allotted Karnataka Cadre. He served in various capacities, with distinction starting his service as Asst.Supdt. of Police, Madhugiri, SP, Uttara Kannada District, SP, DCRE, SP, Lokayukta, SP, Aizawl District, Mizoram, Commandant, Mizoram Armed Police Battalion and Commandant, Central Combined Home Guards and Civil Defence Training Institute, Bangalore. He was promoted as DIG on June 1992 and he served as DIGP, Anti-Terrorist Cell, Bangalore, Intelligence, Forest Cell, Addl. Commissioner of Police, CAR and VVIP Security, Bangalore City and DIGP, Administration in DG and IGP Office. He was promoted as IGP on Aug. 1998 and he served as IGP, DCRE, Bangalore, IGP, North Eastern Range, Gulbarga and Executive Director, Karnataka State Police Housing Corporation Ltd. (KSPHCL) Bangalore.

On promotion to the rank of Addl.DGP on 17-08-2004, he continued as Executive Director, KSPHCL upto June 2005 and he served as Addl. Director General of Police, Lokayukta, Bangalore till Sept. 2007. **From Oct.2007 to 1st May 2012 he served as Director General of Police, Mizoram** and is now working in TOP MOST POST IN KARNATAKA as **Director General and Inspector General of Police, Karnataka State, Bangalore since 31-05-2012.**

Shri. Lalrokhuma Pachuau is the recipient of prestigious Police Medals:

1. The Mizoram Police (Special Duty) Medal in the year 1990.
2. The Indian Police Medal for Meritorious Service in the year 1996.
3. The President's Police Medal for Distinguished Service in the year 2004.

The officer has also undergone several important training courses within country and Outside the country viz.,

1. Common Foundational Course for AIS and Central Service at LBS National Academy of Administration, Mussoorie, India.
2. Civil Defence Training for IPS Probationers at National Institute of Civil Defence, Nagpur, India.
3. Basic IPS Training at SVP, NPA, Hyderabad, India.
4. Police Community Relations at Institute of Criminology and Forensic Science, New Delhi, India.
5. 21st Management Development programme at LBS National Academy of Administration, Mussoorie, India.
6. Executive Development Programme in Industrial and Financial Management at ATI, Mysore, India.
7. Management Orientation Programme at Indian Institute of Public Administration, New Delhi, India.
8. Level-II Management for IPS Officers at SVP, NPA, Hyderabad, India.
9. Vertical Interaction Course for IPS Officers at Indian Institute of Management, Bangalore, India.
10. Re-Union Seminar of IPS Officers of 30th RR 1977 at NPA, Hyderabad, India.

Foreign Training:

Human Resource Development Programme at University of Wollongong,

Australia from 08-03-1998 to 11-06-1998.

Highlights of the Conference

Shri. M.N. Reddi, IPS

ADGP and C&MD, KSPHCL

Your Excellency, senior dignitaries on the dais, esteemed delegates, Ladies and Gentlemen….Sir, it is with immense pleasure, that I wish to present a very brief sketch of the proceedings of the conference since yesterday morning that have resulted in a set of, what we believe, some very fundamental recommendations.

Sir, this conference is the third in the series of the All India Police Housing Conferences. The first was held in the year 2011 in Ahmedabad, the second was held in Patna last year and this is the third that is being held now.

Sir, as you would agree, these conferences were very much due, in the light of the fact that Police Housing is facing a very acute situation of serious gap between demand and supply.

Sir, this conference is attended by more than 20 state Police Housing Corporations. This year, Bureau of Research and Development also invited the representatives of various Central and Paramilitary forces such as CRPF, BSF, ITPB, SSB etc. I am very glad to inform you Sir, we had 4 DGPs of States represented as delegates, we had DGP Kerala attending, of course, and he had to get back yesterday.

Sir, prior to this conference, Hon'ble Home Minister, Karnataka, inaugurated the first ever Fast Track Construction Technology Park that we, KSPHC have proudly built in Adugodi, CAR, (South) Bangalore. Sir, KSPHC has been a torch bearer in implementing new technologies whether it is e-commerce or it is to do with Project Monitoring Systems. We have very clearly realized and are of the opinion that the way forward for construction activity in this country would have to be involving new technologies as we face serious resource crunch, whether it is human resource or natural resources. All the delegates visited the Fast Track Construction Technology Park yesterday morning and we had an assurance that the Police Housing situation in Karnataka state will surely improve in the coming few years.

Your Excellency, I would like to brief you that the conference was divided into three logical compartments of the themes of Technology, Sustainability and Financing. We looked at Technology as a solution to the vicious circle of cost, quality and time that most of the organizations like us are trapped into in the current situation. We had Dr. C. S. Viswanatha, who is the Doyen of Civil Engineering in South India and, who is also the Chairman, Task Force for Quality Assurance in Public Construction, GOK, to address the gathering after presenting a Key Note Address. Very animated and lively discussions took place regarding the technology issue and a lot of people were impressed. ***I believe that 'Technology' is the way forward!***

Your Excellency, we continued to discuss the themes of Sustainability which is of paramount importance because of the ecological imbalance caused by the housing activity, which is very rapidly growing both in the public and in the private sector. Mr. V. Suresh, who was the former CMD of HUDCO made a very detailed presentation on a large canvas of Sustainability including ecological sustainability of housing practices. And once again it was related to the fact that we need to look at technologies that will not only help us cut time, cut cost and improve quality but also which will be sustainable. As we go forward we have got to be responsible to Mother Earth in the sense that we cannot deplete resources in a way that we have been doing in the past.

This morning, there was one important discussion, a Key Note Address presented by Mr. V. P. Baligar, who is from Karnataka State Cadre and who is an IAS officer and Chairman of HUDCO, GoI, on various financing options and who looked at the entire gamut of the requirement of Financing for Police Housing. You would be definitely surprised Your Excellency to know that about one lakh crore of rupees is needed to reach a 50% satisfaction for Police Housing in India including the Central Armed and Paramilitary Forces. So a discussion was held in detail about various options, international experiences as well as some of the schemes that HUDCO has come out with- such as 'Rent-to-Own' Scheme.

After all the sessions were over, there was a large session on discussing the various recommendations of this

conference which should be meaningful and implementable at both the National and State levels. That took us about good three hours of time, where in a group of delegates prepared the documentation and it was presented to everybody and the house broadly agreed on Recommendations. May I bring to your notice that recommendations are pertaining to Technology, Sustainability and Financing.

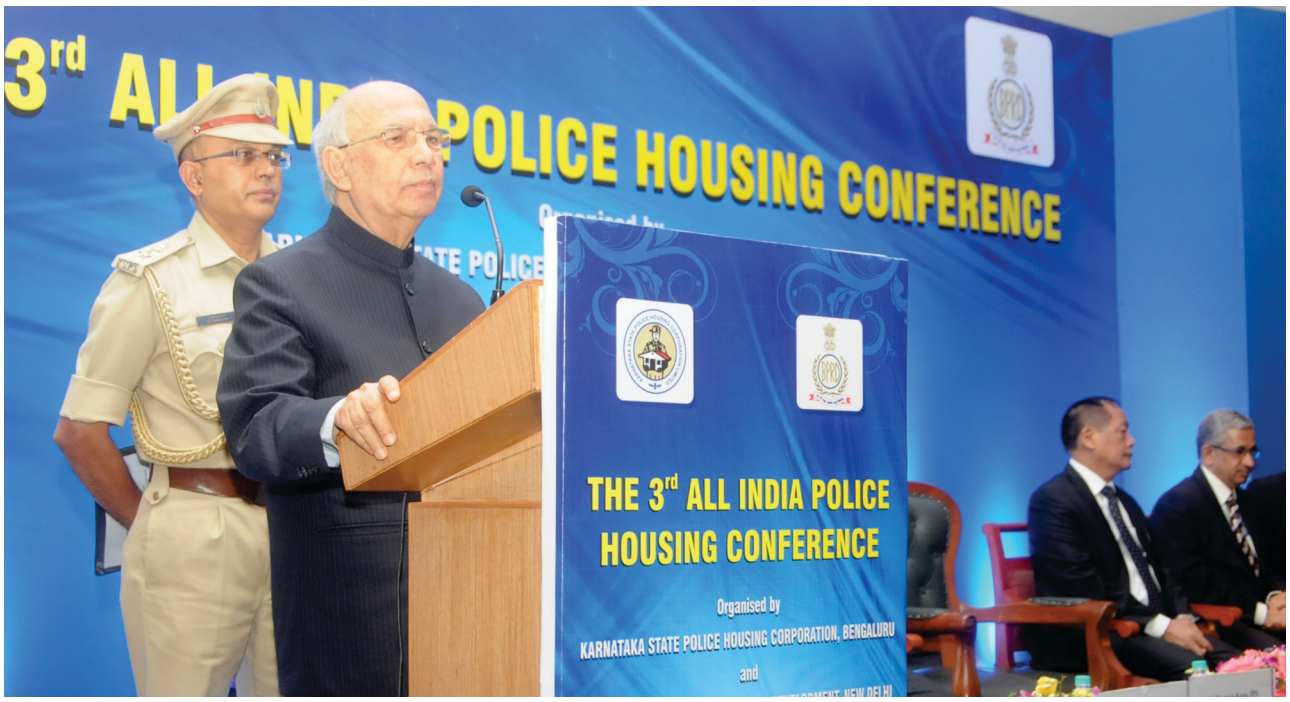
As far as Technology is concerned, the House felt that the only way forward is to adopt useful and applicable technology to achieve improvements in cost, quality and time.

As far as Sustainability is concerned, it was felt that sustainability must be made part of the DNA of the functioning of the Police Housing Corporations, as responsible government agencies, are far more uniquely positioned to implement green technologies because they are not driven by profit motive alone. They are driven by service to the society by way of providing better housing for Police officers and men. This included dealing with water, dealing with sewage plants, hybrid electricity, solar electricity, power generation and host of other areas.

In terms of Financing, a very unique and useful suggestion was made to urge Government of India to consider seriously to create a National level Special Purpose Vehicle in the form of National Police Housing Financing Corporation, so that, it could deal with large gamut of the problem of financing, find solutions, may be issue Police Bonds etc in the country and raise the revenues that are needed, advise and guide the Police Housing Corporations as well as State Governments to achieve a reasonable 50% satisfaction level in the coming few years.

All in all, Your Excellency, this 3rd All India Police Housing Conference-2013 was a very useful, very fruitful exercise and led to extremely lively deliberations. I echo the feelings and opinions, I believe of all the delegates here, when I say that, this has been an extremely useful 2-day experience.

I wanted to present these matters before Your Excellency and I am also extremely grateful that when we came and met you and requested Your Excellency to be a part of it, you not only readily agreed but you had tremendous amount of enthusiasm. I would like to share this, he promptly pulled out a book that he recently published on Crime and Criminal Justice System in India and presented it to me. I was going through the Book Your Excellency and you quote Mahatma Gandhi on what he thinks on what people think a Policeman should be - a policeman has got be everything, a doctor, he has got to be an advisor, he has got to be a guide, philosopher. I believe, you have a very soft corner for the Police officers and the host of Policemen who are serving the society in this country. I very very warmly extend a welcome to you once again and thank you very much for being with us.



Dr. H.R. Bhardwaj

His Excellency the Governor of Karnataka

Excerpts from the Valedictory Address

Let me at the outset disclose my love and affection and respect for the Police force – I am a son of a Police Officer! My father was a Police officer during the British days and mostly his officers were IP officers and the British Government used extensively Indian good Police officers to the advantage of their regime. My father's relations with the British Police remained until freedom of India and then it was the IB, who picked up my father and posted him at Pandit Nehru's house as security officer to the first Prime Minister of India and he died immediately after Panditji in 1965.

I have seen very outstanding and distinguished IP and IPS officers in my life. My father took a word from all of us. We are 3 brothers. I am the eldest, next one is General Bhardwaj, Director General of Armed Forces (Medical Services) and my third brother is still in the Police. Our father said that one of you must go to the Police and one of you must go to the Army. So, in obedience to his command, we have followed up, but, I could not enter either into the Police or the Armed forces as I was the senior most earning member of the family after the death of my father. I dedicated my life to the Bar. I have great regard for the Police force for two reasons:

That I was the law minister for three terms for Government of India and I have worked for several Home Ministers and I have had several occasions to impress upon the Home Minister to implement various reports on the Police Reforms, the Police is the force responsible to investigate the crimes, protect the life and property of the citizens and give them assurance of security. The second part is the 'courts' where the cases have to be expedited. So, obviously, I had to deal with the Magistracy as well as Police. I have participated in all conferences right from 1985. I have invited Scotland Yard, FBI and other very well organized investigating agencies of democratic countries to India. I have also gone to USA and England and I have studied very keenly the Justice system and the Police force. You will read during the British days, the entire British Government depended upon Indian Police. The Police Act of 1861 and CRPC and IPS were also enacted along with the Police Act. The Police is basically present in every village because they constituted Police Stations and if we see the Police Stations constructed during the British days, it is a very comprehensive Police station with Station officer's house within the Police Station. There is housing provided within and good accommodation for

those manning the Police station. Transportation was also arranged according to the vehicle available at that time. Police was given all facilities to work.

Thereafter, Police has expanded in India, after Independence. Though, the force expanded quite a lot, the facilities have not come up. I personally know that these facilities are lacking due to neglect of the Police Department. The result is that the Police is not adequately paid. So, all the Police people suffer from this lack of salary and perks. But, I don't think we have given any serious attention in this country. Then, housing, you are doing duty at this place and living about 20 kms away and no transport to pick up. All these problems have been discussed in our country. They are on record of the Home Ministry.

Until recently, I have been connected with Prakash's case in Supreme Court for insulating the Police force from being politicised. So much of concern has been raised on the autonomy of the CBI. Let us understand the things in proper perspective because Police right from British days is absolutely independent. Lord Denning himself observed “every constable and chief constable for the British Police is independent and no minister can interfere in his work”. It is a reported decision well known to the highest in the authority. Police is an executive arm of the state, to prevent crime and to investigate crime. As an investigating agency, police is independent and no person can interfere during an investigation. Similarly, you are responsible to handle Law and Order problems. While investigation is going on nobody can interfere and right from 1945 Privy Council till today this is consistent view of the courts. But why in our country these issues are coming up. I have been insisting for at least two decades that investigating agencies of the Police should be separated because you ask one inspector or DySP or whoever investigating a case, to first go on some duty and then ask him to investigate some other case. This casual approach of dealing with crimes has destroyed our investigation system. Earlier Police Station was independently supervised by one senior officer up to DIGs range and finally the IG. That was working very well till recently. I have been a public prosecutor for two decades of the High court and the District courts and I myself have watched all these things. But, nowadays, Police has been totally politicalised. The DGs are superseded and are not given the due expectations, and therefore they look to the politicians. This is the malady.

It is time when we have to fasten our belts; Police has to be made an independent entity at all levels, like CBI was separated from the Delhi Special Police Establishment. Why not here? Why not in other states? The DGP and his team should control every thing including the housing. They should simply be given a good budget, they should have a say while deciding the general allocation of finances in the budget. Police should be given priority and that should be left to the Head of the force to see where priority is required and step by step self sufficiency should be achieved. I got it done with Prime Minister Shri. Rajiv Gandhi, when special allocation was made to States for improving their vehicles and lot of Maruti Vans were given and some facilities were given even in arming the Police also. This is needed on very urgent basis, because if the Police collapses which I apprehend if it is not attended now then army cannot attend dealing with the crimes of civil society. Police is the conscience keeper of our society, because they know every person. If you see, during the British days, there were two crime registers maintained by each Police Station and entries were made of the suspects and some people tending to be criminals and they used to keep it up-to-date. So that was the internal information which the Police had of the movement of any criminal, so that society could be kept very secured. I personally know it that in British days my father used to go to a rebellious area in Sindh, Hyderabad and he gave his memoirs personally and how he was treated. He had no house of his own. It was the IGP who sanctioned house money for my father and the first house we built was from that money. So, the welfare of the Police was taken care of. But now, I don't think, I know in Punjab, one DGP is getting prosecuted. In Haryana 2 DGPs have been prosecuted. DGP level, I mean this is the sorry state of affairs, where we are pushing, the Police now. I don't believe in Seminars and conferences. Action should be taken once the problem is well known. Why the Governments are not taking this seriously? Do it on urgent basis! Special allocation should be given and Government can issue bonds. There is no problem.

Government can pass instructions to banks to advance money for Police Housing and even for self financing of

housing, when they can advance the bank money to so many defaulters in other areas. I personally feel that solution should be found by the states and strengthen their Police. Police is very important for Crime control, so that citizens and their property can be safe. If you neglect this, this will lead to grim situation. I feel that too much dependence on CBI should be avoided.

In every state under the constitution, the Police comes under list 2 and so also the Magistracy. Every state has a duty to its citizens and an obligation to protect them from internal disturbances and to protect their life and property. Why it should be neglected? We are recruiting more and more forces but we are not giving them facilities to work. Situations are changing. India is also getting affected by international situations. Our Police force should be made most modern and most alert and the Police should also realise that, if a Police officer or a personnel neglects his duty for any reason, then he ceases to be a Police officer. I have written quite extensively in my life about custodial deaths. When a Police officer is prosecuted, nobody helps him. I'm the only person in India who always defended Police officers in their hour of need. Punjab had tremendous problems. One officer committed suicide by putting his neck on the railway track, because his own people disowned him. Some people came in my contact, I said, I will defend them. You Police officers have done good duties in Punjab and all of them were defended by me personally. In my early life there was an encounter case between Uttar Pradesh and Delhi border. Nobody came forward to help them. Ultimately my father's words came true, I volunteered. I called the IG Delhi and said that I will defend them free of cost. So I went to Uttar Pradesh to defend them and got them acquitted. You see you have to extend full support to the Department and it is the job of the Home Minister and Finance Minister of the state concerned to put money at their disposal. I am also concerned about police housing. I know how much progress is gone into the housing technology. When RK puram area was built, so many massive housing were made for government servants and we set up quick housing by a new technology. Some of the new Government buildings in New Delhi, even Shastri Bhavan was built using new technology. Technology is available but the question is 'what is your priority ?' You should give your first priority to housing. Armed forces are meant to defend the borders, and not for internal security.

I deeply appreciate the concern of the Government in giving the housing facilities to police but yet lot of work has to be done. If your country is not safe within or in the borders, then how will you defend your sovereignty? There should be optimum satisfaction in the Police and there should be up gradation of their qualifications as well as their perks. I have insisted in writing to the Home Ministry in Delhi that wherever you construct any Police Training School or college, provide full housing, right from commandant onwards to instructors and give a good public school for their children's education. You will see it in CRPF and BSF camps. Simultaneously, arrangements were made for housing and education of people working there. Same scheme can be done in. Karnataka. Karnataka is a dynamic state but Police is under a lot of pressure.

Today's conference should have given wide raging recommendations, as so many people are present and you should insist that they are implemented in phases.

Nowadays, we are not working in India to modernize the Police methods of investigation. How many times we need seminars and discussions, Police is a very well trained force. Several people have written about Indian Police abroad. The 'Span' magazine brought out by America, published a full article on Indian Police and one of the observers of UN has commented on how Kiran Bedi was working. I personally feel your discussions must have gone for proper understanding of the problems and viable solutions. Well if Police is not good, there is no good governance at all. At this juncture I can say only this that we must realise that India is a great democracy and democracy survives on rule of law and rule of law prevails where there is efficient Police who does his function with utmost dedication. Courts do it subsequently. So, I thank you for inviting me. I strongly feel from the core of my heart for your welfare.

So this is my duty as the Constitutional Head of the State to stand by the police, down to the man on duty in the traffic road anywhere. I see quite a dedicated force here.

Thank you, **Jai Hind.**

Recommendations of the 3rd All India Police Housing Conference-2013

Preamble

The 3rd All India Police Housing Conference takes note of acute shortage of housing and non-residential police buildings. The conference recommends in every police station and police head quarter, barracks should be made available for 25% of the strength. Quarters should be provided to at least 50% of the personnel. In hard areas including naxal belts training academies and armed reserve battalions 80% of the personnel should be provided quarters while 20% of the personnel should be accommodated in barracks. To achieve this objective the conference adopts following resolutions pertaining to

1. Fast Track Technology,
2. Sustainability &
3. Financing.

1. **Fast Track Technology: Cost, Time & Quality-Technology as a Solution:**

   Police Housing Corporations are facing acute problems of resources including scarcity of water, non-availability of land, sand, metal, power etc as well as skilled and unskilled labour. As a result, there are delays leading to cost and time overruns and thus resulting into overall lesser residential satisfaction level in all states. The Police Housing Conference, therefore, recommends that we should strive to encourage pre-fabricated fast track technology wherever possible in all our projects. In this regard, we recommend the competent bodies should come up with standardized specifications, procedures and prices so that the difficulties regarding floating and finalizing of tenders do not become a hindrance in execution of pre-fabrication technology.

2. **Sustainability:** There is acute shortage of natural resources of including land, water, wood, power. In view of it, the Police Housing Corporations strive to implement measures such as water and sewage plants, hybrid (solar, wind, diesel, electricity) power generation plants. We also make sure that local material will be used in such a way that it does not harm the natural availability of the same. In view of the same we will make audit of all our projects to ensure maximum use of day light, natural ventilation, reduced dependence on power consuming gadgets and resources and ensure sustainability during the construction as well as subsequent utilization.

   We also strive to implement Green Building concepts in our projects not later than 2015. In this regard certain Police Housing Corporation including Karnataka, Maharastra, Tamil Nadu, Bihar and Haryana have started Green Buildings in their states.

3. **Financing:** The requirement of Police Buildings as well as housing for serving and retired personnel is very huge. However, the matching resources to meet this high demand are very weak. The Police Housing Corporations, therefore strongly recommend that there should be National Police Finance Corporation. In addition, the Government of India may also advise the State Governments to allot atleast 15% of the Police Budget for Housing and Administration Buildings including Police Stations.

   We also invite attention for the Government of India and State Governments to the best available internationally such as Work Force Housing Fund for construction of quarters of the Policemen. Another excellent scheme in rental discounts which offers reduced rent to Police Officers. The 3rd scheme is Home

Purchase Programme offered by local government which provided series of benefits including matching down payment funds, deferred payment loans, income tax credit in the tax year of the purchase and four succeeding tax years and a property tax credit for five years.

In the new urban areas being planned, the development plan right at the time of conception, should reserve plots of land for police station buildings and quarters for policemen. The local government should also provide fencing for these plots to avoid encroachment.

HUDCO has launched a scheme called “Rent to Own” for various service personnel including policemen. The State Governments may adopt this scheme at the earliest. In this regard, the Police Housing Corporations recommend reduction of 2% interest as a subsidy by the State Governments. This will reduce the burden on the State Governments for constructing quarters for the policemen.

` Housing and construction activity for police department should be part of the plan expenditure in all the states.

CPMFs may be allowed to assign their construction works to the local PHCs. Central funds including MOPF funds should be directly related to the PHCs to facilitate prompt utilization of the same for construction activities.

The above recommendations should be similarly made applicable to personnel to personnel from Prisons, Home Guards, Fire Departments wherever applicable.

Committees

The management of KSPHC would like to acknowledge the excellent work of our conference organizing committee which comprised of the following:

CORE COMMITTEE:

1.Shri. M.N. Reddi, IPS, ADGP and C & MD, KSPHC.

2. Shri. Sujit Kumar Chowdhury, Financial Adviser & Nodal Officer

3.Shri. T.Bisse Gowda, Chief Engineer

4.Shri. Madhav, Superintending Engineer, (Headquarters)

5.Shri. K.V.Rudrappa, Superintending Engineer, (North/South)

NODAL OFFICER:

1. Shri. Sujit Kumar Chowdhury, Financial Adviser & Nodal Officer

TRANSPORT COMMITTEE:

1.Shri. Chandrashekar, Executive Engineer, Gulbarga

2.Shri. Abdul Ghani, Assistant Executive Engineer, Contract

3.Shri. P.R. Magenni, Assistant Administrative Officer

4.Shri. Chikkegowda, First Division Assistant

RECEPTION COMMITTEE:

1.Shri. Mutagi, Executive Engineer, Belgaum

2.Shri. Safiulla Hussaini, Assistant Executive Engineer

3.Shri. Nagesh Kumar, Manager, Business Development

4.Shri. Thomas, Second Division Assistant (Contract)

PUBLICITY COMMITTEE:

1.Shri. C.N.Jagadish, Executive Engineer,

2.Ms. Hasina Yakub, Manager PR & Co-ordinator, Fast Track Construction

3.Smt. Malini, Computer Operator, PMS

SOUVENIR CUM EXHIBITION COMMITTEE:

1.Shri. Madhav, Superintending Engineer, (Headquarters)

FINANCE COMMITTEE:

1.Shri. Sujit Kumar Chowdhury, Financial Adviser & Nodal Officer

2. Shri. Chelvaraj

3. Shri. Neelkantappa

COMMUNICATION COORDINATOR:

1.Smt. Altaj Yakub, Communication Coordinator

Conference Program - Day 1

30.05.2013 (Thursday)

TIME	Event
9:15 AM	Inauguration of " KSPHC Fast Track Construction Technology Park " at Adugodi, Bangalore
10:00 AM	Inauguration of the 3rd All India Police Housing Conference at Hotel Lalit Ashok, Bangalore
	Registration & Tea Break
11:30 AM - 1:30 PM:	**"Meeting the challenges of cost, time and quality - Technology as a Solution":** Key Note Address by Dr. C.S. Vishwanatha, Chairman, Task Force for Quality Assurance in Public Construction, Govt of Karnataka, followed by presentations on various Fast Track Technologies by the concerned industry representatives.
	LUNCH BREAK
2:00 PM - 3:00 PM	Continuation discussion on the theme "Meeting the challenges of cost, time and quality-Technology as a Solution" with special focus on Police Housing with a Panel Discussion by the representatives from Industry, Academia and MDs of selected Police Housing Corporations.
	TEA BREAK
3:00 PM - 4:30 PM:	A thematic discussion on **"Sustainability – The Fourth Dimension in Construction",** Key Note Address by Shri V. Suresh, Ex-CMD. HUDCO and Director of Project Companies of HIRCO, followed by a panel discussion by heads of Police Housing Corporations.

Day 2

31.05.2013 (Friday)

TIME	Event
10 : 30 AM - 1 PM	A Thematic Discussion on **"How to Finance the Police Housing For Tomorrow"** with a Key Note Address by Shri. V.P. Baligar, IAS, Chairman & Managing Director, HUDCO, New Delhi, and Panel Discussion by representatives of selected Police Housing Corporations followed by an interactive session.
	LUNCH BREAK
2:00 PM -3:30 PM :	" Sharing of experiences and ideas on Technology, Financing & Sustainability" Presentations by selected Police Housing Corporations
	TEA BREAK
4:00-5:15 PM	A structured discussion to finalize conference recommendations
5:30-6:00PM	Valedictory Function: Valedictory Address by Dr. Hansraj, His Excellency the Governor of Karnataka.

List of Participants

Sl.No	State /PHC	Name of Officer	Designation
1	Andra Pradesh Police	Shri.D.Venugopal Raju	SE
	Housing Corporation Ltd	Shri.V.Agai Reddy	EE
2	Assam Police Housing Corporation	Shri.Rajendra Kumar,IPS, 1980	DGP & CMD
3	Bihar Police Housing Corporation	Shri.Sunil Kumar,IPS, 1987	ADGP cum Chairman Cum M D
		Shri.Dukhi Shah	Chief Techincal Advisor
4	Delhi Police Housing Corpoation Ltd	Shri.T.N.Mohan,IPS, 1986	Special Commissioner of police and MD
5	Gujarat State Police Housing Corporation Civil Supply Corporation Building	Shri. Jignesh. M.Bhalani	Architect
		Shri. S.G.Shah	Sr. Manager (F &A)
6	Harayana Police Housing Corporation Ltd	Shri.B.S.Sandhu, IPS, 1984	ADGP & MD
		Shri.Sanjay Mahajan	CE
		Shri.Sukhbir Singh	EE
		Shri.Sanjay Verma	Consultant Architect
7	Himachal Pradesh	Shri.S.R.Mardi, IPS,I986	ADGP, State C.I.D
8	J & K	Dr..S.P.Vaid,IPS,1986	ADGP (Hqrs)
	J& Kashmir Police Housing Corporation Ltd	Shri.Dilbagh Singh,IPS,1987	ADGP and MD
9	Jharkhand Police Housing Corporation Ltd	Shri.V.H.Deshmukh, IPS, 1986	ADGP cum MD
10	Karnataka	Shri.Alok Kumar, IPS,1994	IGP
11	Kerala	Shri.K.S.Balasubramanian, IPS, 1978	DGP
	Kerala Police Housing Corporation Ltd	Shri.Anil Kant, IPS, 1988	ADGP & MD
12	Madhya Pradesh Police Housing Corporation Ltd	Shri. P. K. Tripathi	FA/CAO
13	Maharashtra state police housing & welfare corpn Ltd	Shri. Praveen Dixit,IPS, 1977	DGP and MD
		Shri. A.A.Khot	SE
14	Manipur Police Housing Corporation Ltd	Shri. T. Pachuau, IPS, 1987	IGP and MD
15	Nagaland	Shri. Besesaya Kezo,IPS, 1978	DGP
		Shri.Vikedosie Kehie	Chief Engineer, Police Engineering Project
16	Odisha	Dr.Debasis Panigrahi, IPS,1991	IG(Modernisation)
17	Odisha Police Housing & Welfare Corporation Ltd	Shri.Satyajit Mohanty,IPS, 1988	ADGP & Chairman Cum MD

18	Rajasthan State Police Housing & Construction Corporation Ltd	Shri.Megh Chand Meena,IPS,1987	ADGP & OSD
19	Tamil Nadu Police Housing Corporation Ltd	Shri. Thiru.M.Kumar	Chief Engineer
20	UP Police Awas Nigam Limited	Shri.P.K.Agarwal	EE
21	West Bengal Police Housing Corporation Ltd	Shri C.V. Muralidhar, IPS, 1984	ADGP & MD
22	ITPB	Shri. Rabindra Pandey	DIG(Engr) Central Frontier,HQr ,ITBP,Bhopal
23	BSF	Shri.Ashok Kumar,IPS, 1989	IG(Administration)
24	BPRD	Shri. Radhakrishna Kini A, IPS, 1981	ADGP
		Shri.Anand Prakash,IPS, 1986	IG/Director(modernisation)
		Shri.S.P.Sharma	Principal Scientific officer
		Shri. Anurag Gangwar	Senior Scientific assistant
25	HQ National Security Guard	Shri. C. N. Suresh	Director (Engg)
26	Sashastra Seema Bal(SSB)	Shri. Pankaj Grover	SE, Force Hqrs

Glimpses of the 3rd All India Police Housing Conference held on 30th & 31st May 2013 at Hotel Latith Ashok, Bangalore

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Jayanagar : No. 27, "Anand Chambers" Elephant Rock Road, III Block, Near South End Circle, Mob : 9343994604

Minerva Circle : No.3, Building # 13/1, Ground Flr, Mutton Cross Road, Corp Dvn No.53, Mavalli, Minerva Circle, Mob : 9343994605

T Dasarahalli : Flat No.41, No.162, Jayaram Complex, 60 feet Road, Chokkasandra, T Dasarahalli, Mob : 9343994608

Rajajinagar : No.597, Sri Ranga Arcade, Dr. Rajkumar Road, Prakash Nagar / Rajajinagar, Mob : 9343994603

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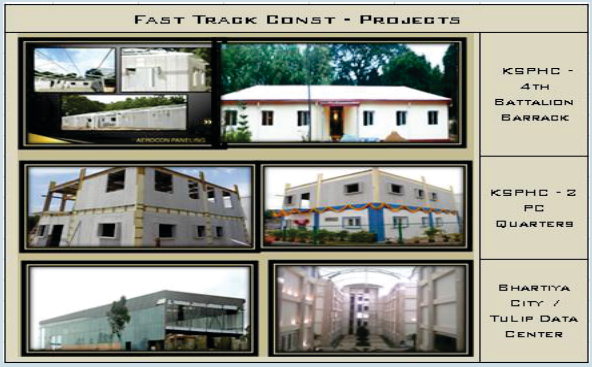

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ENGINEERS & CONTRACTORS

GULBARGA

With Best Wishes

KHAJA MEHMOOD PATIL

PWD Class 1 Contractor

#11-1814/17A Vidyanagar

Gulbarga

Mob : 9535734555, 9036687055

With Best Wishes

Shri. Jayaramaiah.G
Chairman,
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Bangalore-560 079
e-mail: giriconstruction66@yahoo.com
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With Best Wishes

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Engineers & Contractors
 # 768/34, R.P.D. College Road, Hindwadi, Belgaum-590011
Ph:0831-2481434

Praveen N. Bhute B.E.(Civil)
Engineers & Consultants,
 # 105, Bhagyodaya Building, 2nd Cross, Bhayganagar,
Belgaum-590006
Mob: 9845050315 Tel: 0831-4213159

With Best Wishes

C.B. BANDAGI

Engineers & Contractors

116-B,Parvati Nivas, Radhakrishna Marg

Hindwadi,Belgaum-590011

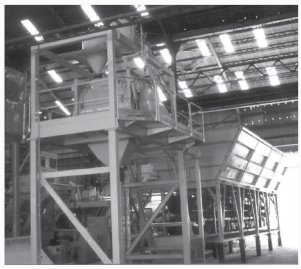
Mob : 9448110805

2465995, 2480010

SHIRKE GROUP OF COMPANIES

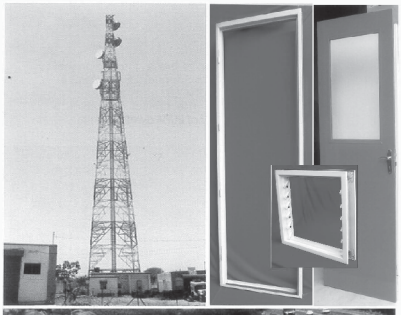
DEDICATED TO INDUSTRIALISE CIVIL ENGINEERING AND BUILDING CONSTRUCTION

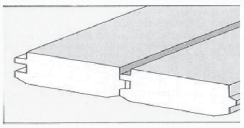
GROUP WITH DIVERSE STRENGTH

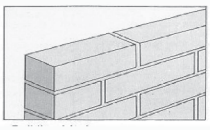


We manufacture

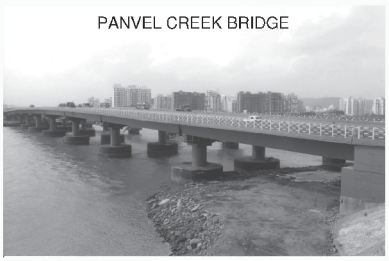
- Large Specialised Steel Structures.
- Automatic Concrete Weigh Batching and Mixing Plant
- Transit Mixers
- Galvanized Microwave / Transmission towers
- Metal Beam Crash Barriers
- GIC Silo and Handling System
- Metal Door / Window Frames and Shutters - Polynorm
- Autoclaved Cellular Light Weight Concrete - Siporex
- Pre-engineered structural components, ready to assemble at site –Prefab '3-S' SYSTEM







PANVEL CREEK BRIDGE



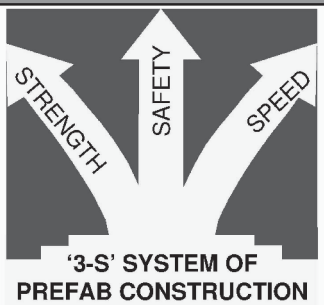
High rise building in modern proven Prefab '3-S' Technology.

A FUSION OF STAPATYA-SHILP KALA & MODERN TECHNOLOGY

QUALITY WITH BIS & INTERNATIONAL STANDARDS ⇒ PERFECTION ⇒ CUSTOMER'S SATISFACTION

STRENGTH & EXPERIENCE

- Established in 1944.
- Dedicated team of about 10,000 Workforce.
- Civil, Mechanical & Electrical Engineers, Architects, Planners, Designers.
- Management, Financial Experts.



'3-S' SYSTEM OF PREFAB CONSTRUCTION

CAPABILITIES

- Proven Capability to execute Large-magnitude Projects, including planning, designing of infrastructure services, on turnkey basis.
- Roads – Bridges, Buildings, Industrial Projects.
- Machinery and Equipments manufactured with upgraded Technology.

SHIRKE™ GROUP OF COMPANIES

Multi Disciplinary Civil, Mechanical & Electrical Engineering Consortium.
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DNV MGMT. SYS. RvA C 024
DNV Certification B.V., The Netherlands

KARNATAKA STATE POLICE HOUSING CORPORATION LIMITED

Jampana Construction Private Limited is a leading Infrastructure Company making its presence felt in the field of Construction of various categories of buildings like Layout & Housing, Commercial Complexes, Factory Buildings, Schools & Colleges, Hospitals, Major Bus Stations, Roads & Bridges for Public & Private Sectors like KSPHC, KHB, HSCL, NBCC, KRDCL, KHSDRP, KSRTC, MESCOM, BDA, KPWD, R & B Andhra Pradesh, APEWIDC, NAC, MES, KSSIDC, RMSA, RITES Limited, and DRDO and successfully completing its projects since 2003.

JAMPANA CONSTRUCTION PRIVATE LIMITED

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