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RB Suryavanshi, a civil engineer, is working with Shirke Group of companies for over 50 years as member of the Top Management – Senior Chief Executive. As early as 1978, he visited Saudi Arabia as a member of Overseas Construction Council of Government of India. He has successfully completed various civil projects including Housing, Commercial, Educational buildings, Industries, IT parks, Airports and Auditoria. The monumental and ornamental projects of “Vikasa Soudha” at Bangalore and the “Suvarna Vidhana Soudha Legislative assembly at Belgaum were constructed under his leadership.

A prolific author, his article on “Prefab Housing” and “Building a Quality Culture” were published in prestigious journals. His professional associations are also numerous. He is council member of Quality Council of India and Chairman of Builders’ Association of India and member of Mahratta Chamber of Commerce, while socially, he is active with the Lions Club International.

He values the importance of knowledge exchange and dissemination. He believes in training for improvement of the Organisation as well as the Individual. His social commitment is seen in his emphasis for construction for toilets for girl students in remote schools. He desires to continue his social activity in the future also.



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## Envision Pune 2040: some glimpses

*Swapnil Patil*

*Award winning Architect and Urban Designer*

Something important has happened in the last year or so. The term “smart city” for first time has brought the discourse on our cities and urbanization into mainstream and common man has started talking about our cities. This is indeed a significant achievement, because very little attention has been paid in the last 68 years since independence....It reminds me of Lao Tze’s proverb that a journey of thousand miles begins with first step....

“Envision Pune 2040” is a project, which looks at one of the many possibilities of how an important city such as Pune can grow. Pune is expected to grow from its current 50 lakh population to about 90 lakhs in a span of 15 years. Much of Pune’s growth and urbanization is organic without a long term vision plan.

This study tries to address fundamental questions such as protection of environment and natural resources, metro line to effectively interconnect the city, creating a

network of parks and open spaces, exploring opportunity sites for affordable housing and slum rehabilitation and where and how should future growth of Pune occur within the expanded municipal limits of Pune.

The “Envision Pune 2040” Vision Plan looks at approximately 15,000 acre opportunity sites which include an internal ring road, a riverfront development, a new downtown/CBD, Smart townships centered on transit stations, redevelopment of public lands such as Railway stations and Cantonment areas as a land monetization mechanism for revenue generation. These opportunity sites are expected to house a resident population of about 10 lakhs with roughly 2 lakhs jobs, 1200 acres or parks and open spaces.

My firm has been working on this diligently, for last ten long months and have done this pro bono study which I am delighted to share with you all.



**River front Development**



Our Masterplan Proposal for University of Pune is an extension of UOP Vision Plan 2020 created by University through stakeholder engagement in 2006. The Masterplan

consists of a Framework plan which takes into consideration the future growth of the campus. Series of strategies deal with accommodating this growth and yet retaining the green cover for the campus.

The Campus Masterplan emphasizes on enhancing the connectivity, walkability and flexibility to accommodate the future uses and growth for the campus. A series of network of new streets and pedestrian pathways interwoven through the courtyards of buildings forms a web of connections. The Masterplan aims to create distinct zoning, open space network and a new sports village and students village for the campus. The identity of the campus will be enhanced through Architecture guidelines.



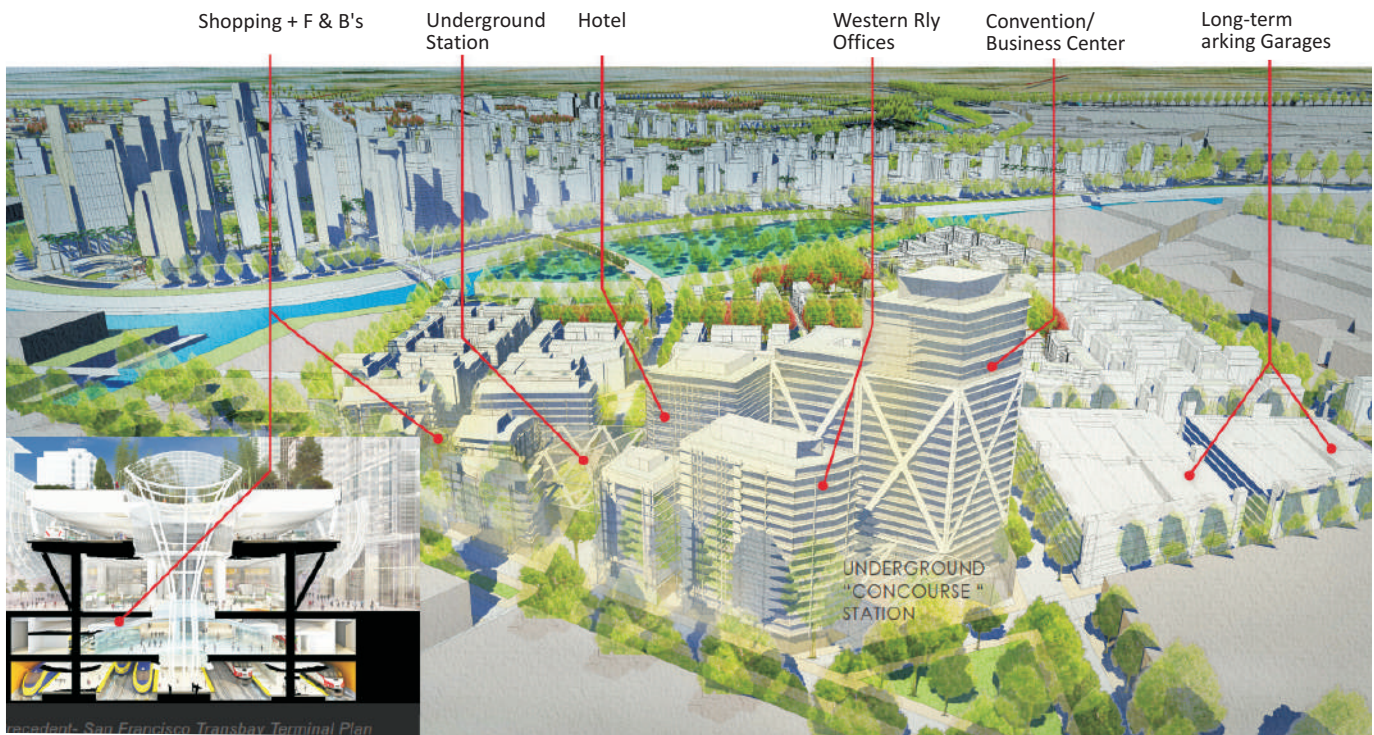
*Proposed Pune University Vision Plan*

**How much is the “Tax Payer Owned”, Cantonment Land worth?**



- 15% of India’s total affordable housing requirement
- As per land norms, excess land of 80,000 acres
- Land worth Rs 11,000 crore were leased Rs 2 crore pa

Source: Anil Nair, ARC team, Janaagraha





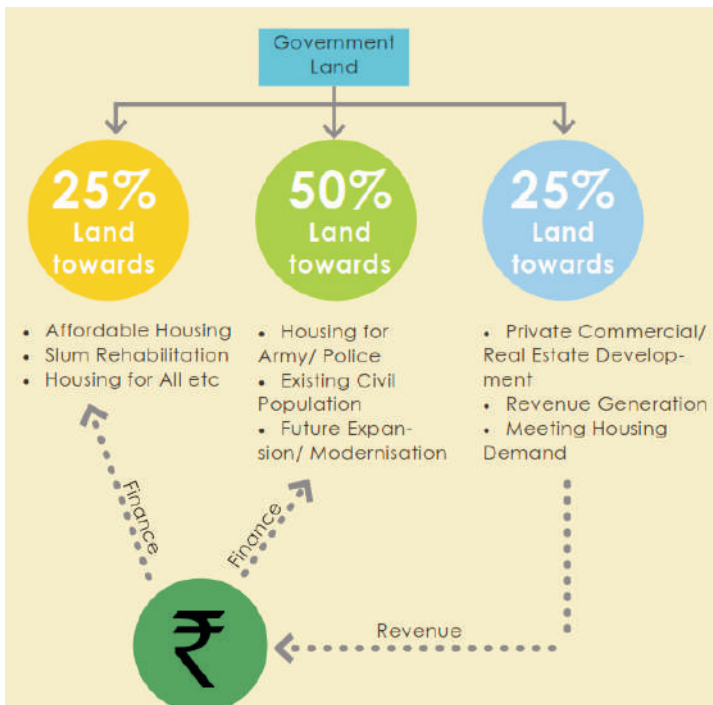


3200 ACRE MUNDHWA GREENFIELD DEVELOPMENT “AS A TOD” UNDER TPS

**3000 ACRE PUNE CANTONMENT “AS A SMART TOD “**

Pune Cantonment is approximately 3000 Acre land that was located outside the old Pune city at its inception by British in the erstwhile British ruled India.

Currently due to the urbanization over last 60 years, the cantonments have come into the middle of City Municipal limits. Ironically Pune Cantonment today hosts only a population of about 90,000 people at a density of about less than 1 person/acre. In contrast the Pune’s density stands at approximately 65-70 persons/acre.



Development Mechanism For Govt Land

Taking cue from Base Realignment and developing of defense land towards public housing from US and Phillipines, the idea behind this vision is to explore the possibility of envisioning public land such as Defense to be developed to its fullest potential and provide housing both for Army staff as well as people of “under-privileged class under housing for all by 2022 scheme”.

The important premise behind this idea is to use the existing assets in the form of public lands and use the same towards developing the housing opportunities for public sector as well as private sector. The vision looks at developing half of the existing land to meet the needs of housing for Army staff, one fourth towards affordable housing and remaining one fourth towards private sector development to raise the capital and monetize the existing assets.





Proposed Mula Mutha Riverfront View with Light Rail, Active Public Realm, Local Cafe's Restaurants along the Riverfront

**15 KMS MULA MUTHA RIVERFRONT PLAN TO REVITALIZE THE CITY**



**15000 ACRE UNIFIED PUNE CITY WIDE VISION WITH AREA BASED PROPOSALS**

- Visualize what a city would look like...
- Create Extensive Outreach with Stakeholders & Citizens
- Develop City wide Vision Plan Followed by Long Term Concept Masterplan
- Identify Quick Wins/ Startup Projects such as Garbage disposal/ Street Trash, Parks & Open Space Masterplan, Unified Transit Strategy, Green Streets etc
- Ensure International Standard Deliverable in Concept Masterplan
- Market the Vision well to Common Man, Give them a hope....
- Finally...Create Outreach about Need for Vision Plan and Concept Masterplan....



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**Pune  
Municipal  
Corporation**

## PMC's MISSION SMART CITY

### Detailed proposal for Aundh Baner Balewadi area.

*(The article has been prepared with extracts from  
"REIMAGINING Pune: MISSION SMART CITY"  
published by Pune Municipal Corporation - Ar. Shekhar Garud.)*

Pune Municipal Corporation has made herculean efforts to be included in the Government of India's ambitious plan of creating 100 smart cities throughout India. One of the components of the proposal to be submitted in the competition included specific demonstrative proposal within the city turning that area into a "Smart City". Through active participation of citizen groups, various organizations and after long discussions and deliberations with Wipro, Siemens Consortium, Catapult and Microsoft, a democratic and rational choice was made to propose detailed plan for AUNDH BANER BALEWADI (ABB) area with the following considerations:

- ◆ An area of over 900 acres and a sizable population (40,000) was earmarked.
- ◆ A strategic location at the entry point into Pune from Mumbai side was chosen.
- ◆ Large 3.5km riverfront area was identified, which is mostly residential and which can be developed for mixed-use development. The area also has large private land parcel of 70 acres next to riverfront for model development.
- ◆ The area has potential of creating a start-up zone, leveraging the entrepreneurial energy of Pune.

#### **Seven Smart Urban Forms to be incorporated in ABB are:**

1. **PLANNED DENSIFICATION:** The unutilized amenity spaces of nearly 16 acres will be developed to create social infrastructure to have three additional schools, three multi-speciality hospitals and 76 public toilets, along with smart parking for 750 cars.
2. **CREATING UNCLUTTERED PUBLIC AND OPEN SPACES:** Thirteen open spaces will be developed to create gardens ensuring that all residents can access a garden in just 5 minutes. The gardens will remain open till late night with adequate security features and facilities. Street hawkers will be shifted to newly developed vegetable market. Total open space is expected to increase to 10% of the total area.
3. **URBAN RIVERFRONT DEVELOPMENT:** 3.5 kms of walking promenades and 18 acres of urban farm will be developed further increasing the open space.
4. **MIXED USE :** To promote a walk-to-work culture, over 45,000 primary jobs will be created by developing 15 acres of commercial office space and 12 acres of start-up zone.
5. **UNCLUTTERED PUBLIC SPACE :** A transit hub will be created at the ABB entry restricting heavy vehicles entering into this zone. Special electric buses will be operated between Aundh and Hinjewadi, serving over 50% of working population in Aundh.
6. **PLACEMAKING THROUGH STREET, FOOTPATH AND JUNCTION REDESIGN:** It is proposed to redesign over 60km of footpath, 15 junctions and 27km of streets as smart urban forms.
7. **WALKABILITY AND VEHICLE REDUCTION:** 100 % walkability to gardens will be ensured by connecting them with footpaths. A public bicycle system will be initiated to connect Pune University Campus and other 40 stations.

It is expected that the proposals in the Smart City Plans should achieve convergence in terms of human and financial resources, with schemes the government has already announced, like AMRUT (Atal Mission for Rejuvenation and Urban Transformation), HRIDAY (National Heritage City Development and Augmentation Yojana), SBM (Swachcha Bharat Mission), IPDS (Integrated Power Development Scheme), SHELTER FOR ALL, DIGITAL India, MAKE IN India, SKILL India ETC.



It is expected that ABB will create a zero-waste society that scientifically disposes off 100% of waste of which 50% is utilized towards energy generation, 30% will be recycled and 20% will be used in road surfacing and brick making. 100% source-segregation is targeted using ICT solutions like GPS-enabled trucks.

Transmission and distribution network will be strengthened under IPDS to ensure that the utility services are future-proof. Smart grid and smart meters will be demonstrated in the ABB area.

Under Digital India Mission, vocational and skills training to the ABB community will be offered using the community halls, with a mission that by 2016, at least 1 person from each household will be digitally literate.

The proposed start-up Hub, setup with NASSCOM, will be linked to Atal Innovation Mission. Entrepreneurship among innovative thinkers in the start-up hub will be linked to Technology Business Incubator (TBI), wherein the start-ups will be able to apply for soft loans.

treatment plants and integrating the proposed sewer lines with the existing infrastructure and measures.

Total 36 local area development ideas have been floated for which significant governance and competency will be required. A separate SPV (Special Purpose Vehicle) will be proposed which will include 45-50 strong team structure and consisting of the right people to drive action on the ground.

PMC has also been working on making changes to Development Plan to help in land use conversion since amenities land will now will be required to be used as amenities + commercial for Transit land.

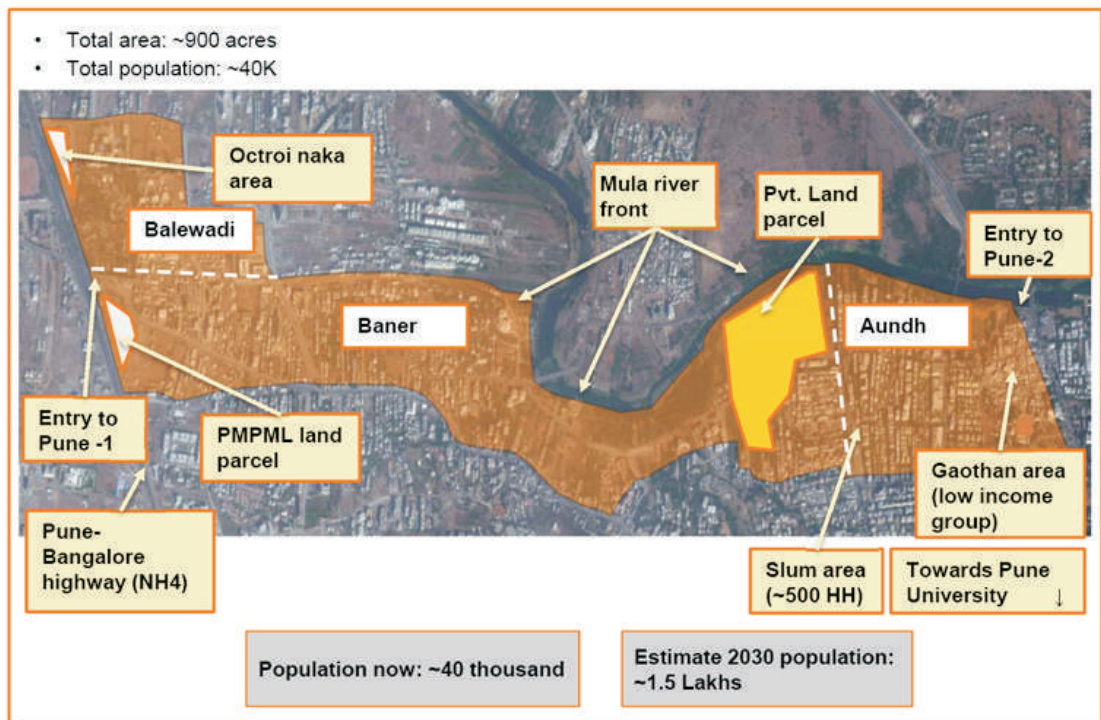


Exhibit 11: ABB - 900 acres indentified with many potential interventions possible

Under the ambit of Housing for All policy, 486 slums in the area will be rehabilitated for which Slum Rehabilitation Authority will be responsible.

PMC will get loans under AMRUT to build key infrastructure to help the deficient 14% population of ABB area overcome water scarcity ensuring min. 135 lit per day per person.

A comprehensive plan has been created under NRCP (National River Conservation Project) to clean the Mula-Mutha rivers, entirely preventing the discharge of domestic sewage into the rivers, rehabilitating the existing 50 year old trunk sewer and existing sewage

The exercise has certainly shown that if the civic administration, political leaders and the citizens dedicatedly work towards a mission, a workable plan could always be developed and pursued. The National agenda must always find its reflection at the local level to succeed in the implementation. The global connectivity has helped in creating a kind of healthy awakening in the citizens to strive for livable environment, whether in rural area or urban area. Only time will tell if this awakening turns into tangible development and not day-dreaming.





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## Pune Metro Railway - A Game Changer for Pune & PMR

*Shashikant Limaye*

*Officer on Special Duty Pune Metro Project,  
Pune Municipal Corporation*

### 1. The Need

Pune is one of the largest cities in Maharashtra State and fastest growing city in the country. It is well-known in the world map because of its educational & research institutions, IT Hub, Auto industrial activities, residential building sector etc. Pune Municipal area extends over 243 sq.km and Pimpri Chinchwad over 177 Sq.km. The recently formed Pune Metropolitan Region (PMR) extends over approximately 2943 SqKm and its population is about 65 lakhs. By 2031 it is projected that PMR will reach a population of more than 1 crore.

The vehicle population in Pune and surroundings is of the order of 27 lakhs (22 lakh two wheelers and 5 lakh four wheelers). Every year nearly 2 lakh two wheelers and 50000 four wheelers get added to this stock. The volume capacity ratio (v:c ratio) on the roads has already reached 2. As a consequence of increase in vehicles the PM10 pollution levels have risen by 36% over the past 5 years and it is a matter of grave concern. This trend is essentially due to lack of efficient and reliable Public Transport System in Pune and its surroundings.

Public transport use has come down to 18 % (as against target of 80% set in National Urban Transport Policy of 2006). The present Public Transport system comprising city buses run by PMPML is not able to satisfy the demands of the commuters in the city. The suburban train system is limited to one chord between Pune and Lonavla a distance of 64 km. Only about 3 % of the total commuter traffic is carried by the suburban train service. Railways do not have any plan in foreseeable future to augment the suburban railway system.

Continuing on this path without seriously and expeditiously implementing a Mass Rapid Transit system could be disastrous for Pune and its surroundings and it will stunt the PMR dream right at its inception.

### 2. Background

Even as far back as 2006 keeping these trends of rapid urbanization of Pune and its surroundings in perspective, the Union Govt. selected Pune as one of the first six Metro Projects to be implemented in India viz. Delhi –Phase II, Bengaluru, Hyderabad, Kolkata – Phase II, Chennai. Out of these Delhi–Phase II is completed, Hyderabad ( 68 km) nearly 80% of work is complete, Bengaluru (44 km) is nearing completion partly opened and Chennai partly opened. Pune Project continued to be under unending discussions for over five years after preparation of Detailed Project Report by DMRC in the year 2009. In the interregnum Metro Projects at Jaipur, Kochi, Lucknow, Nagpur, Mumbai (Line 3, Line 6 & Line 7), Ahmedabad, Vijaywada have got the approvals and progressed on the ground at a rapid pace. Now Pune stands at something like Sr. No. 14 and Not Yet Approved ! It is finally in December 2015 that the revised DPR with certain minor changes in the alignment has been submitted to the Union Govt. for its approval. The loss of 6 years has resulted in increase in price by approximately Rs 4000 Cr from Rs 7800 Crore !

### 3. Salient Features of Pune Metro project – Phase I

As per the revised DPR following are the details of the Project :

#### Corridor 1 – Pimpri Chinchwad to Swargate

- a) Length - 16.59 Km., (underground 4.66 km)
- b) Stations - 15 (Elevated - 9 nos, Underground - 6 nos)

#### Corridor 2 – Vanaz to Ramwadi

- a) Length - 14.67 Km. (entire corridor elevated generally placed at median of road arteries/ along service roads and along left bank of Mutha River from Khanduji Baba Chowk to Bal Gandharava Bridge or along service roads)
- b) Stations - 16 (All stations Elevated)

**Estimated Cost**

Corridor	Length km	Cost at Nov 2015 prices (Rs Crore)	Completion cost (Rs. Crore)
Corridor 1 – PCMC to Swargate	16.59	6072	7628
Corridor 2 Vanaz to Ramwadi	14.67	3149	3894
<b>TOTAL</b>	<b>31.515</b>	<b>7284</b>	<b>11522</b>

**Fare Structure**

Proposed fare structure on commissioning in 2020-21 (when the project is expected to be commissioned) is as below

DistanceIn km	0 to 2	2 to 4	4 to 12	12 to 18	Above 18
<b>Fare in Rs. 2020-21</b>	10	20	30	40	50

**Technical Parameters**

Important technical parameters are as below :

- Gauge – Standard Gauge (1435 mm)
- Rolling Stock:- 2.9 m wide AC Modern rolling Stock - Stainless Steel Body
- Signaling system : -Cab signaling with CBTC
- Traction – 25 KV (AC)
- Fare Collection system – Automatic fare collection with use of smart cards & tokens.
- Initial Train Operation Plan

**Corridor 1:-** 4 minutes headway with 4 car train sets (capacity 1000 commuters)

**Corridor 2:-** 12 minutes headway. with 4 car train sets (capacity 1000 commuters)

When commissioned it will be the state of the art Metro System

**Intermodal Integration**

One of the most important issues addressed during realignment of Corridor II was to accomplish seamless intermodal integration at Deccan Gymkhana and PMC Bus Stands of PMPML.

Metro Proposal envisages major interchanges with the PMPML bus Systems at :

- Corridor 1 :- Sant Tukaram Nagar, Shivajinagar, Nata Wadi, PMC and **Swargate (Inter Modal Transit Center – IMTC)**.
- Along Corridor 2 :-Kothrud, Deccan Gymkhana, PMC, Pune Station

Schemes are already being evolved for IMTC (Intermodal Transit Center) at **Swargate** in an area of approximately 10 Ha. This is being conceived with the objective of achieving full integration amongst PMPML- City Bus service, MSRTC – Outstation bus service, proposed Metro and future Monorail. Parking lots of capacities of the order of 8000 (for 2 wheelers) and 2000 (for 4 wheelers) are also envisaged as a part of this ambitious project.



PMPML bus routes including BRTS which emanate or pass through these interchange points could be charted in order to bring out the last mile connectivity which could be accomplished for the Pune Metro system. Interchange with BRTS's which run along certain sections of the Metro Corridors such as Nagar road and Mumbai Pune road could also find a place in this exercise.

While planning of Metro Stations at interchange points seamless integration of Commuter movement from one mode to the other mode is proposed to be meticulously addressed.

**Integration with Railways.**

Pune Metro Project Phase-I has planned interchange with Indian Railways at (i) Kasarwadi (Mumbai Pune Road), Khadki, Shivajinagar along Corridor 1 and (ii) Pune Station along Corridor 2. Shivajinagar is being developed by Central Railway as a Model Station and while detailing the Shivajinagar Metro Stn. it is proposed to evolve the scheme jointly with the Central Railway to accomplish seamless integration. Similarly, at Pune, Khadki and Kasarwadi while developing the schemes for Metro stations the concept of seamless integration is proposed to be accomplished in consultation with Central Railway.



**4. Raising of Funds**

Broadly the cost of the project will be borne by Central Govt (20%), Maharashtra

State Govt. (20%), PMC & PCMC (10%) and balance 50% to be raised through loans under bilateral funding mechanisms. To cater to the funding by the two Municipal Corporations and for servicing the debt following mechanisms are envisaged to raise the funds:

- ◆ Enhancement of Development charges by 100 % and raising revenue from this mechanism.
- ◆ Surcharge on Registration charges and Stamp Duty on property transactions at 1 % and raising revenue from this mechanism.
- ◆ Commercial utilization of Metro stations and Car

maintenance Depots and raising revenue from this mechanism.

- ◆ Utilization of revenue generated through Advertisement and Parking for Metro Project.
- ◆ Densification of Metro corridor by permitting use of 4 FAR and raising revenue from this mechanism.

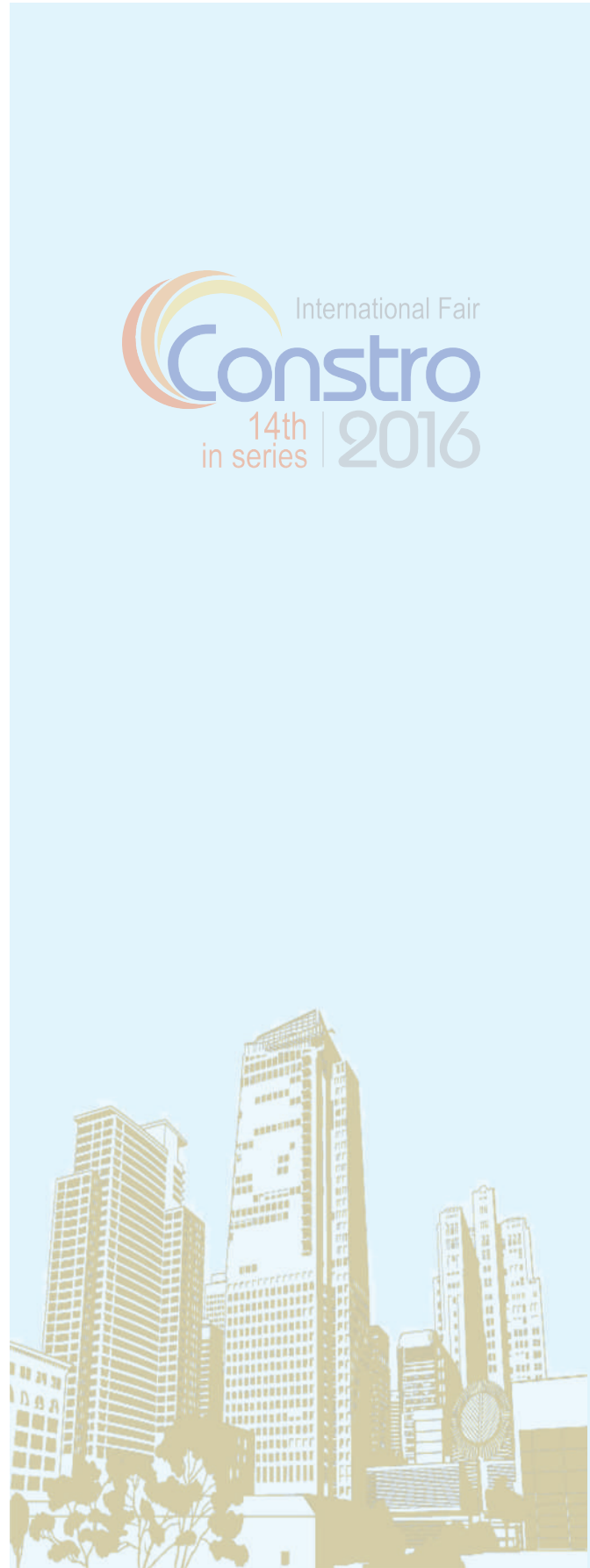
The revenue generated for the above sources is to be deposited in Urban Transport Fund to be created by the Municipal Corporations and utilized for additional financial support to these projects and debt servicing.

**5. Future Extensions and Importance for PMR**

Phase I of Pune Metro Project extending over approximately 32 km should not be viewed in isolation but as a nucleus of the future Metro Network in Pune



Metropolitan Region. In times to come Pune Metro Network could become as large as 200 km. Some of the extensions which could be envisaged are (i) Ramwadi – Wagholi – Ranjangaon, (ii) Swargate to Katraj, (iii) PCMC-Nigdi- Moshi- Chakan – New Airport, (iv) Hinjwadi – Baner – Yashda – SPPU – Range Hill, (v) Nal Stop – Warje – Nanded City – Sinhadgad Road – Katraj – NIBM Rd – Hadpsar–Kharadi – Wagholi. It is an accepted fact that without an efficient transportation backbone no Metropolitan Region can prosper. Today most of the Metropolitan regions are planned commencing with the planning of Public Transport arteries principally MRTS and BRTS. It is a golden opportunity for Pune as PMRDA is very recently formed. It is the PMRDA which should be authorized as a nodal agency to plan for future Metro extensions, BRTS corridors, New Airport, New Railway Passenger and Freight Terminals etc. if Pune and its surroundings are to be developed in a systematic and integrated manner.





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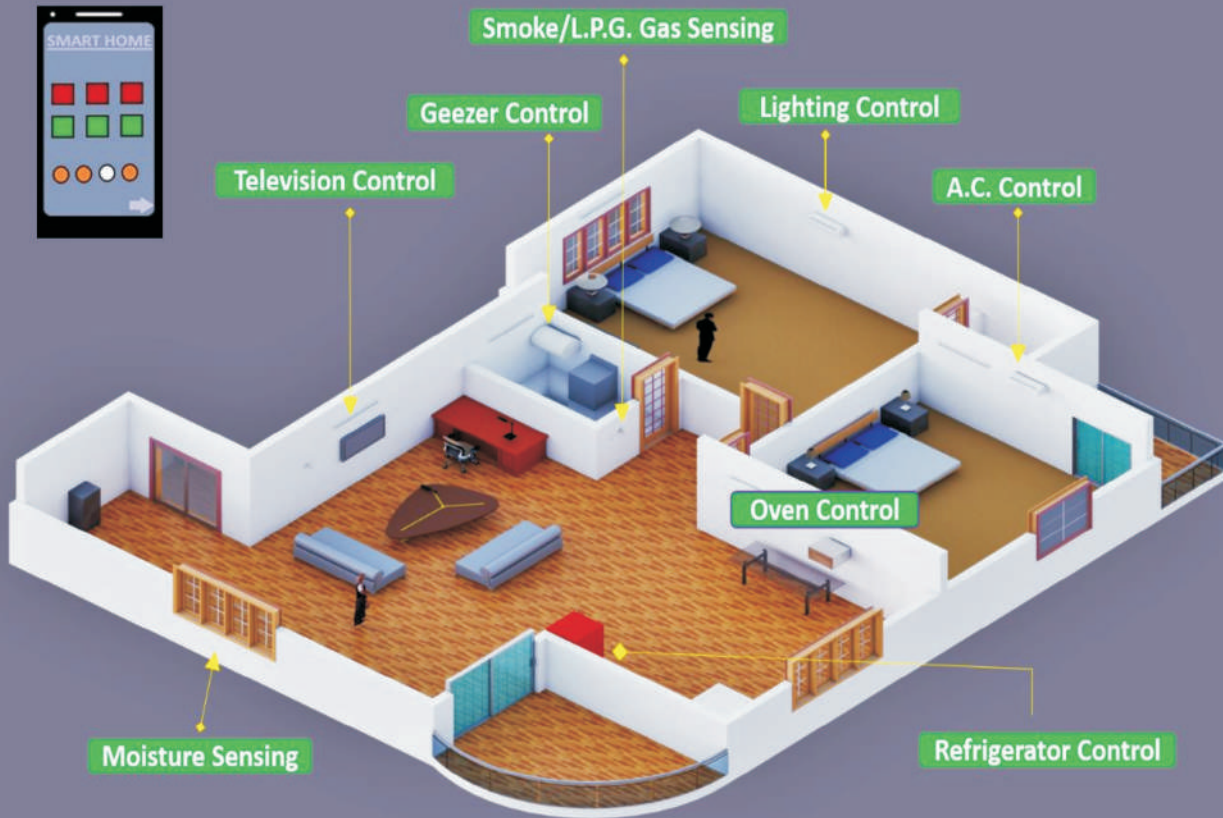
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## Smart Cities : A Mission For Better Future

*Shekhar Garud*

*Practicing Architect and Academician*

The rapidly growing urbanization of the cities is continually throwing up many challenges of the management of the cities. The urban management involves the issues of transport / mobility, waste management, energy production and distribution, water supply and drainage treatment. The unchecked growth of the urbanization has led to haphazard planning and management of the resources and services and it is now realized that unless some action is initiated now, the cities will start deteriorating. The Census 2011 has revealed that nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP. The Census 2011 also helps in projecting that by 2030, the urban areas will house 40% of India's population and contribute 75% of India's GDP.

For the development to be meaningful expansion of cities the livability of the cities need to be improved consisting of comprehensive development of physical, institutional, social and economic infrastructure. All these aspects are equally important in defining the livability of the cities.

The Global presence and penetration of Internet as a reliable, instantaneous and widespread medium of communication, coupled with necessary hardware has opened up tremendous opportunities in management of the cities and every government is trying to take the advantage of the situation. Not only the government but even common man now has access to internet even through hand-held mobile sets and mobile apps. Truly the world is not only within everyone's reach, it is even on their palms. Digital technology is being extensively used to enhance the quality and performance of urban services, to reduce costs and resource consumption and more importantly, to engage more effectively and actively with its citizens. This phenomenon has led to the coining of the term SMART CITIES.

Smart cities are also been described as cyberville, digital city, electronic communities, flexicity, information city, intelligent city, knowledgebased city, mesh city, telicity, teletopia, ubiquitous city, wired city etc. All these names point out to the proliferation and dependence on information sharing through digital communication.

The basic concept of smart cities revolve around Traffic and Transport management, availability of Government services through networking, control over energy distribution and consumption, management of healthcare, water and waste, improvement in Urban Management and allowing real-time response to challenges.

The rapid urbanization, industrialization, improvement in health care management etc have also led to climatic changes, economic restructuring, growth of aging population, pressures on public finances etc. which has led to global interest in developing Smart Cities.

Information and communications technology (ICT) is often used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise. The European Union, in year 2010 declared "Europe's Digital Agenda" for strengthening innovation and investment in ICT for improving public services and quality of life. Accordingly "Smart City Technologies and Programs" was implemented in Southampton, Amsterdam, Barcelona and Stockholm.

In Amsterdam the street lights were upgraded to allow the council to dim the lights based on pedestrian usage. The app "Mobypark" allows owners of parking spaces to rent them out to people for a fee. The data so generated

would be used to analyse parking demand and traffic flows. (See Fig 1)



**Fig 1 – Steet Lights in Amsterdam**

Source : Source : en.wikipedia.org

In Barcelona, sensor technology was implemented in irrigation system used real time data transmitted to garden crews about the level of water required for the plants. To improve the transportation, new bus network was designed based on the data analysis of most common traffic flows utilizing vertical, horizontal and diagonal routes with a number of interchanges. Buses run on routes designed to optimize the numbers of green lights. Emergency vehicles' route can be monitored through a mix of GPS and traffic management software, setting all lights green, thus enabling a fast movement. (See Fig 2)



**Fig 2 – Bus network in Barcelona developed after smart city data analysis.**

Source : en.wikipedia.org

In the city of Santacruz, California the local authorities analyse historical crime data in order to predict policing requirement and maximize police presence where it is required.

There have been many attempts to define the Smart City. Deakin and Alwear's definition or factors include

- a. Wide range of digital technologies to communities and cities.
- b. Use of ICT technology transforming life and working environment within the region.
- c. Embedding of ICT in government systems
- d. Territorialisation of practices that brings ICT and people together to enhance innovation and knowledge that they offer.

Caragliu and Nijkamny (2009) defined smart city where investments in social and human capital and traditional and modern communications infrastructure fuel sustainable, economic development and a high quality of life with a wise management of natural resources through participatory action and engagement.

Indian government (2014) opines that the smart city offers sustainability in terms of economic activities and employment opportunities to a wide section of its residents, regardless of their level of education, skill or income levels.

As a part of Prime Minister Narendra Modi's vision of "ACHCHE DIN", he unveiled an ambitious programme of creating "100 Smart Cities" in India and allotted nearly Rs. 7060 crores towards the same. The smart cities are meant for "Neo-middle Class" who have just emerged from above the poverty line and are striving to ensure to remain there. It is planned to give nearly 70 crores to each city as "Seed Money" to get the project going and more funds could be allotted when demonstratable improvement is seen. It is envisaged that the smart city would be a space that is ecologically friendly, technologically integrated and meticulously planned with a particular reliance on the use of IT for improving efficiency.

It is expected that 600 million of Indians would be living in cities by 2030 and cities would generate 70% of the new jobs producing more than 70% of India's GDP. The cities



would drive a fourfold increase in per capita incomes across the country. This speed of urbanization poses an unprecedented managerial and policy challenges, but according to an MGI report, India has barely engaged in a national discussion about how to handle this seismic shift in the make-up of the nation.

While voicing the concern for the underprivileged, Prime Minister Narendra Modi said “ we cannot leave our poor to their fate, it is our responsibility” and explained his vision of a smart city which is two steps ahead of the needs of the people, where people can walk to work saving the energy.

The government must ensure that the new cities need to be planned so that the pressures are taken off the existing cities and aims to build satellite towns near the existing urban centers on “Smart Cities Template”.

The Indian government has announced three flagship schemes, with a total expected expenditure of more than Rs. 4 Lacs crores:

- 1 Smart Cities Mission: The cities would be selected through competition and each city would get central funding of Rs. 100 crore per year for 5 years.
- 2 Housing for all by 2022: creating 20 million homes for urban poor
- 3 Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

For the selection of the cities for the Smart Cities Mission “The City Challenge Competition” would be organized as the 1<sup>st</sup> round wherein the states would score all its cities based on a set criteria. The top scoring cities would be nominated for the 2<sup>nd</sup> round of competition. The existing levels of providing services to the citizens would be prominent criteria in the first round.

**The core infrastructure elements in a smart city would include:**

- i. Adequate water supply
- ii. Assured electricity supply
- iii. Sanitation, including solid waste management,
- iv. Efficient urban mobility and public transport
- v. Affordable housing, especially for the poor
- vi. Robust IT connectivity and digitalization

- vii. Good governance, especially e-governance and citizen participation
- viii. Sustainable environment
- ix. Safety and security of citizens, particularly women, children and the elderly
- x. Health and education.

**The typical features of comprehensive development in Smart Cities are :**

- i. Promoting mixed land use in area-based developments
- ii. Housing and inclusiveness
- iii. Creating walkable localities
- iv. Preserving and developing open spaces
- v. Promoting a variety of transport options
- vi. Making governance citizen-friendly and cost effective
- vii. Giving an identity to the city
- viii. Applying smart solutions to infrastructure and services in area-based development.

**Three models of area-based development proposed by the Mission are as follows:**

1. Retrofitting : An area consisting of more than 500 acres will be identified by the city and strategy to make it more efficient and livable by intensive infrastructure service levels and a large number of smart applications will be evolved.
2. Redevelopment : achieved by replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density on an area of more than 50 acres. Two examples of the redevelopment models are the Saifee Burhani Upliftment Project in Bhandi Bazar, Mumbai and the development of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.
3. Greenfield : This development will introduce most of the Smart Solutions in a previously vacant area ( more than 250 acres) using innovative planning, plan financing and plan implementation tool ( e.g. land pooling / land reconstitution) with provision for affordable

housing, especially for the poor. One well known example is GIFT CITY (Gujarat International Finance Tec-City is an under-construction central business district between Ahmedabad and Gandhinagar). Greenfield developments could be located either within the limits of the Urban Local Bodies or within the limits of the Urban Local Bodies or within the limits of the local Urban Development Authority. (see Fig. 3)

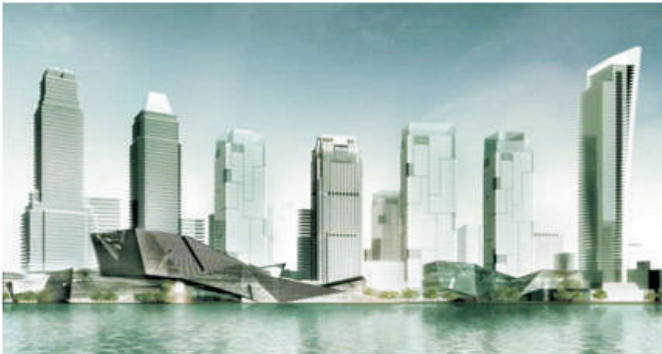


Fig 3 – GIFT CITY

Pan-city development envisages application of selected smart solutions to the existing city-wide infrastructure. It involves use of technology, information and data to make infrastructure and services better. Waste water recycling and smart metering which can make a substantial contribution to better water management in the city, intelligent traffic management systems are examples of Pan-city development concept.

Pune Municipal Corporation has already taken up a number of initiatives towards being a Smart City, through integration of ITC. Citizens' complaints about road, drainage, water supply etc could be lodged on the portal of PMC, the property tax payments could be made online, even the building permissions could be approved through online procedure. Suggestions are invited online from the citizens for participatory civic budget. PMC had also floated citizens' competition for their ideas about the smart cities. ( See Fig 4)

The Prime Minister has certainly managed to create a long term focus on improving livability of the existing cities or boosting the economy by creating green field development, in a planned, nationwide manner. The success of this mission lies in the co-ordinated effort by all the stakeholders like citizens, local authorities and state governments. If the coming five years are dedicated solely for effective implementation of the mission, India will see itself riding on a expressway to sustainable development. Though the IT solutions are the driving force behind the mission, one must understand that the enlightenment of the citizens as the key factor influencing the development and the improvement in the physical infrastructure are ultimately the REAL and not VIRTUAL benefits.

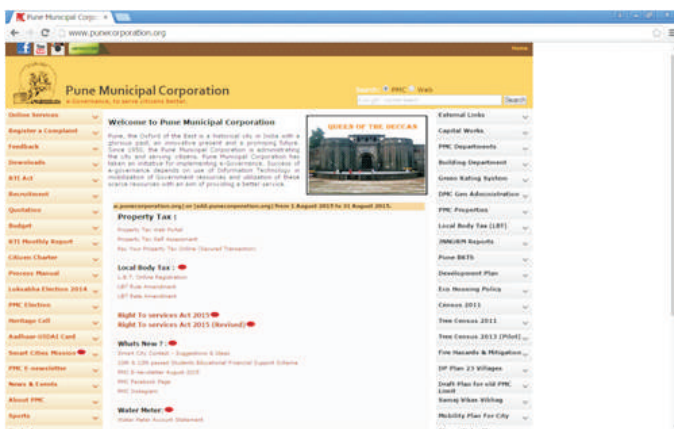


Fig 4 – Web portal of PMC. Source – www.punecorporation.org

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## The Smart City Syndrome

*Snehanshu Mukherjee*

*Practicing Architect and Academician*

What is a Smart City? The answer to this question is something that many of us have been seeking ever since the term appeared on the horizon. I would like to clarify here in the beginning that I do not have the answer, and that there are no single definition, at least in the common public domain, that can satisfy those who are curious. All I can surmise is that at the moment the term "Smart City" is currently some kind of "buzz word" often used as an advertising catch line.

In India there are hardly any built examples of such a development. GIFT or Gujarat International Finance Tec-City near Gandhinagar is being touted as the first Smart City. However, so far, too little of it has been built or inhabited to be assessed for success or failure as a Smart City. One does however notice that many of the buildings designed for GIFT are glass towers set within a barren landscape of wide road networks, that too in an environment that can stay at 50 degrees Celsius for a great many days! Many of the other examples of Smart Cities are yet to be planned, let alone built - so what we know about them is precious little. Instead we see glossy images that a range of developers, that range from government agencies to real estate builders, have been advertising as "artist's impression" of what a Smart City would look like, accompanied by all the usual adjectives and "buzz words". The latest in such expositions is the Amaravati, the new capital of Andhra Pradesh. The state seems to be wooing capital by presenting an image that would attract people and institutions with money to invest, if in nothing else, then in the real estate opportunities created. As C Ramachandraiah, an urban analyst in a recent essay states,



"Surbana International Consultants, the urban consultancy firm from Singapore, envisages the new capital city to be "the pioneer Smart City of India" with "world-class standards set forth by countries such as Singapore." That it is an exercise in projecting a certain image is evident from what the plan document states about it, here I quote from the EPW essay, "...Amaravati is envisaged to be built in an area of 217 square kilometres, the master plan covers 391.63 sq km for the long-term period up to 2050. The capital region will be 7,420 sq km. The "Seed" (this acronym is not expanded in the plan) development area will be the core city in about 17 sq km. The master plan adopts four key "place making strategies" for Amaravati - Gateway, Downtown, Government Core and Water Front. The Gateway will "create the first impression" while entering the city. Downtown will be the commercial heart, the Government Core will house the seat of the state government, and the Water Front will have "an iconic image and skyline." The Business District of the new city is expected to house "large corporate houses, the headquarters of banking and financial institutions," with a "corporate hub" and a "financial hub." There will also be a "knowledge hub," and a "tourism / heritage / leisure hub," along with the usual cultural centres, transport infrastructure, and so on of the like

which one comes across in city master plans. All these are expected to make Amaravati a mega city."

### **Economic and Political Weekly: September 19<sup>th</sup> 2015**

Is the Smart City like a Smart Phone? Some of us have heard of or already experienced Smart Phone controlled homes. Where, through specific software installed on a dedicated computer, all devices and appliances within a

house that are powered through electricity can be programmed for efficient and optimized performance. Therefore, devices installed within a house, be they light fixtures, HVAC equipment, burglar alarms, garage doors, cars or microwave ovens can all be monitored and controlled remotely through the owner's Smart Phone. In concept, I would guess, that the idea is similar in the case of a Smart City, except that the software in question and operating systems become far more sophisticated, as it is meant to control the workings of an entire city – right from traffic and street lights to the water supply and sewage system. The logic behind such a strategy being that the cities have become too complex, therefore we need to upscale our Building Automation Systems to configure an entire city. Such sophisticated operating systems or OS already exist for managing manufacturing in factories through automation, replacing human workers wherever possible. Large multi-national corporations have been the creators of such software for a variety of applications that range from manufacturing to financial services and banking. The last worldwide financial meltdown saw a drop in the business of such software companies, which caused them to turn to 'greener pastures' to sell their wares, namely the city corporations, to do so they invented the term “Smart City”.

The question that naturally arises here is, will such software/hardware combinations get us this wonderful Smart City? Can the existing un-Smart ones also be turned Smart? The answer given by “those who know” – the technocrats and bureaucrats, is that our existing dysfunctional cities can be made functional by retrofitting them into Smart ones and the new ones should anyways be made Smart to begin with. Such a response conveniently sidesteps the inconvenience of answering why the cities have become un-Smart in the first place. So does this mean that once we have Smart Cities we can go back to the “business as usual” mode? Which means that each one of us can continue to be energy guzzlers, be consumers and generate waste for ever - now that the Smart City can fix all ills and save us from extinction? Can it actually do so - is the question therefore.

We need to comprehend that the systems that run Smart Cities are merely a tool that hope to manage the current unmanageable state of our cities. Most importantly we need to understand that our lives in cities and

increasingly in the rural areas are more and more dependant on the use of energy and other precious resources like water “on the tap”. And that these usages are possible because of industrially made products and by-products, sold across the globe with further expenditure of energy and natural resources. Most such products are manufactured through exploiting non-renewable sources and through highly polluting methods. To counter such a situation, is it possible to become any smarter than “smart”? In other words is it possible to become “wise”? As we all know it is not enough to have a few wise people in a society, we have several still and we have had many more in the past, but the no one listened to them. We have to have a community that puts real value to “wisdom”, value much above monetary value. Then we can reside in a habitat that is healthy, safe, pleasant and adequate for everybody's needs. A city that can be walked about - without losing ground to motor vehicles. Where we can make things and grow food that we really need. Where we live closer to the ground, afford relevant education and right employment and time for leisure; all within a manageable commutable distance, and without being totally dependent on captive energy for survival. Is this a pipe dream? Or, isn't this what the Smart City ought to be? But then, one must remember that the Smart City is the latest version of the same modernist city from the “Age of Industrialisation” – the very genetic makeup, inclusive of all the defects, that the Smart City is hoping to resolve. We would like to accept this new version simply because we are unable to visualize a different option. The scenario that I have tried to outline above as the livable city is the very antithesis of the modernist city. And in my opinion a more futuristic option to the Smart City. To see the best examples of such a city one needs to step ahead to the past. One of the last such futuristic cities was established on 29.11.1727 in India and it was called Jaipur! The new extensions to the “wise” old city of Jaipur are nothing like the original; furthermore the original has been modified for the worse by the new. How and why this happened is another story. All I have to state here is that instead of a city being fashioned as Smart let us build the city as envisaged by the “wise” - as was all the indigenous cities of the past.







## Smart Cities and Our Future

*Niranjan Garde*

*Practicing Architect and Academician*

This article attempts to explain the relation of Smart Cities on social dimensions of the Society – or the possible effects of Smart Cities on social behavior, since other articles focus more on the aspect of energy efficiency and optimization.

The nature of construction is at a point where boundaries between building technology, automation and IT are getting seamless (Shah, 2015). What does this mean for people and what kind of community does this way of living generate? Will this be an appropriate way of experiencing the life in the city? Let's try to visualize these things:

Essentially, automation is an integral part of Smart City module. Whatever can be automated in terms of skills, resource management, monitoring and maintenance, will be programmed accordingly. Examples of city level surveillance systems, management and treatment of water supply and plumbing and other service networks, traffic management, financial transaction systems

employed in any business and service outlets will be controlled and fed in a central automated system. Weather updates also fall in this category. In sum, this is a management of people, resources and everything that the 'city' comprises of. Any parameter of life that can be represented as bits of 'data' (information) will eventually be managed by automation. Therefore, planning is done for increased automation (and not necessarily to cater to other human dimensions of experiencing city life). What kind of life an individual will experience here?

In situations where one is staying alone and can't rely on social network for support, Smart Cities offer him ideal choice of living. He is reminded of his daily commitments by smart phone, his daily essentials such as cooking, washing, cleaning are automated; the indoor light, humidity, and temperature of air in his apartment is monitored depending on his individual parameters of comfort and so on. By sitting at one place, he is connected virtually to everything – he can purchase furniture, to gadgets, to food, to grocery, to banking. He

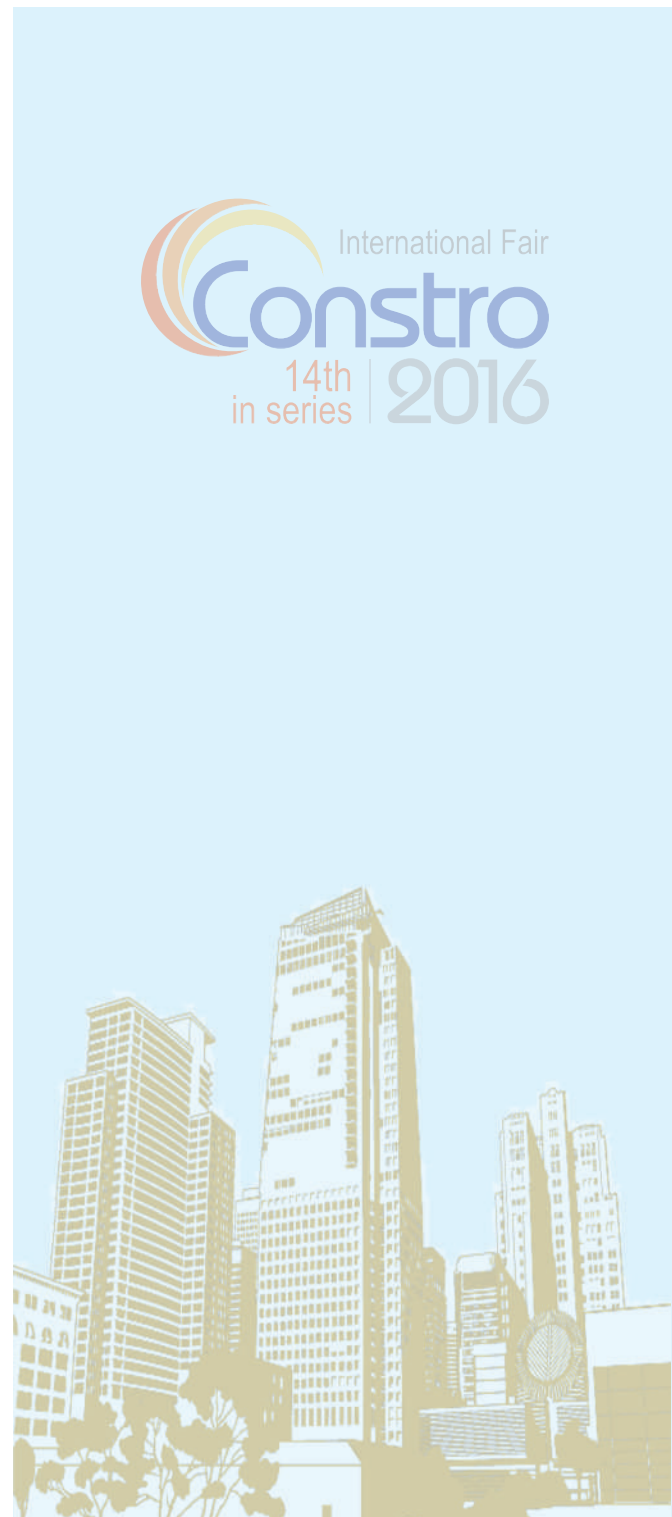


can virtually connect with a physical site or a person present on any other location on the planet and coordinate activities. What this type of reality points out that the cost of increased automation in Smart Cities directly reduces chances of real-time personal interaction with people and the Society at large. This has a danger of eventually leading to emotional detachment with everything around us – from people's concerns, feelings to the entire concept of environment and the 'context' required to design meaningful, social spaces. Loss of social experiences leads to detrimental rise in the feeling of mental insecurity, anxiety, stress. Therefore at risk, is our own detachment to the contextual environment around us. Will the 'Smart City' be “felt” as a City of diverse aspirations expressed by the people or will it resemble an autonomous space wherein a few lakh people are living individual lifestyles not intersecting with anyone else? If it is the later, the concept of Smart City has to be implemented with caution. Does Smart City lead to community living or heightened sense of isolation? Perhaps the fundamental question to be asked is what defines the quality of our experience? And is this experience born out of knowing a place, its people and interacting with them or does it evolve from an isolated existence? A truthful answer to this question will help us assess the role of technology inherent in Smart City model and what kind of impact it creates on people's relation to each other and oneself. It would be worthwhile to consider case studies of recently constructed Smart Cities to know their impact on social dimensions ( ) and to see those lessons with caution as we move towards implementing Smart City concept in India, which boasts of diversity of climate, culture, technology and aspirations.

As mentioned in other articles by different authors, cities are understood as places of great social opportunities and experiences. These experiences are born out of ways of doing things together and governing them, and by mutually being interdependent leading to personal commitment, emotional ties and sound judgement about people's behavior and their minds. It also leads to greatest of values – “acceptance” of context and its interpretations.

I believe, that architecture should attempt to address this interpretation of 'contextual' relationship – climate, culture, technology and aspirations. Whatever technology we adopt – be it Smart City or otherwise, this

respect for context should never diminish in our designs and understanding of people and places. Constant application of contextual thinking will correctly help us to define exact scope of Smart City model in India.







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## PRECAST TECHNOLOGY: THE ONLY SOLUTION FOR PROVIDING AFFORDABLE MASS HOUSING WITH BEST QUALITY WITHIN MINIMUM CONSTRUCTION PERIOD



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### PREAMBLE:

Our Honourable Prime Minister has already declared that by 2022, about 2 crore affordable houses for the needy will be constructed all over India.

### INDIA'S HOUSING SHORTAGE:

The report of Technical Group on Urban Housing Shortage (TG-12), prepared by Ministry of Housing and Urban Poverty Alleviation, National Buildings Organization, states that there is total shortage of 18.78 million houses in urban area for the Economically Weaker Section (EWS) and Low Income Group (LIG), and the component of the same is about 95%. Also, there has been extremely slow progress in providing affordable housing to the people in this segment.

The basic need of human being is "Roti, Kapada and Makan". By and large, the Government has been successful in solving the basic issues, like Roti & Kapada, to some extent. However, as far as the "Makan" is concerned, there has been extremely slow progress in providing affordable housing mainly for Economically Weaker Section (EWS) and Low Income Group (LIG) categories.

Our Founder Chairman, Padma Shri B.G. Shirke, had remarked with firm conviction that "HOUSING CAN MAKE OR BREAK THE GOVERNMENT AND SOCIETY". Our Honourable Prime Minister, a visionary, has appreciated the importance of providing the basic necessity to the common man, i.e. shelter in the form of affordable house and accordingly has prepared an ambitious programme in his own wisdom for providing affordable housing for the weaker sections of the society.

### PM's MISSION - HOUSING FOR ALL:

As per the Government's ambitious Housing for All Mission to be accomplished by year 2022, when

independent India will be celebrating its 75<sup>th</sup> Independence Day, every Indian family should have a house of its own.

As per the article, published in the "Indian Express" on Friday 23rd January 2015 titled "Unveiled: Modi's housing for all plan", the Government plans to build 2 crore houses by 2022. Out of these, 1.8 crores houses will be developed for the slum dwellers while 0.2 crore houses will be developed for the urban poor.

For fulfilling this ambitious programme of new Government, such massive requirement of housing, particularly for EWS & LIG categories, cannot be met with by conventional outdated methods and materials. This is so because, apart from being costly and scarce, these materials and methods to a larger extent have outlived their technical and commercial usefulness, inasmuch as they have no capacity to touch even the fringe of the massive demand and supply situation prevailing in India, today. In order to meet this mammoth task of housing, we would require over 125 constructors, having capability to deliver at least 20000 houses yearly.

### Precast Technology: Only Sure Solution To Mitigate Housing Shortage

With the rising cost of construction due to increase in cost of material and labour, there is a need to adopt cost effective construction methods either by up-gradation of traditional technologies using local sources or applying modern construction materials and techniques with efficient inputs, leading to economic solutions.

Precast Technology is an optimal choice for those, valuing short construction times and reduced lifecycle costs of buildings. It provides both speed and quality of the construction and also capitalizes on the advantages that these large scale projects offer in terms of volume turnover and the repetitions. Though precast building

construction industry is still in its nascent stage in India, it is rapidly coming to the forefront of the construction industry as the most sought after cost effective technology, which is fast outpacing the conventional technologies existing in India and all over the world. So far, precast technology has been mostly used in construction of large scale projects, like bridges, flyovers, tunnels and metro rails in India, but one can now increasingly witness its use in construction of mass housing projects and commercial projects, such as hotels, hospitals, schools etc.

**Broadly, there are following 3 types of prefab systems being practiced in the world;**

- A. Using precast columns, beams, slabs and walls.
- B. Using precast long walls with hollow core slabs.
- C. Using Steel Structures (PEB Structures).  
–Generally used for Industrial structures.

Industrialized construction with precast concrete is sustainable, economical, of high quality, earthquake-resistant and has hardly any limitations. Thus, the only definite solution for resolving such gigantic issues of social and national importance, i.e. providing affordable mass housing particularly for EWS & LIG categories, is to adopt tried, tested and proven prefab system.

The Authorities in different States have also realized that awarding work on lump sum turnkey (LSTK) basis on proven prefab technology is the only solution for executing mass housing schemes. Various Authorities & Boards from different States of Maharashtra, Delhi, Karnataka, Tamil Nadu, Bihar, Gujarat and Rajasthan etc. are also inviting tenders on LSTK basis with Prefab Technology.

Our Founder Chairman, Padma Shri B.G. Shirke, a great visionary and reformist, had visualized the burning problem of housing shortage in India about 45 years ago and decided to completely transform civil engineering into its total industrialization by innovating, developing and introducing new products, having scientific & objective quality controls and capable of being modularly planned for economy and standardization, which can cope up with future challenges for effectively solving India's acute and nagging problem of housing shortage and slum proliferation.

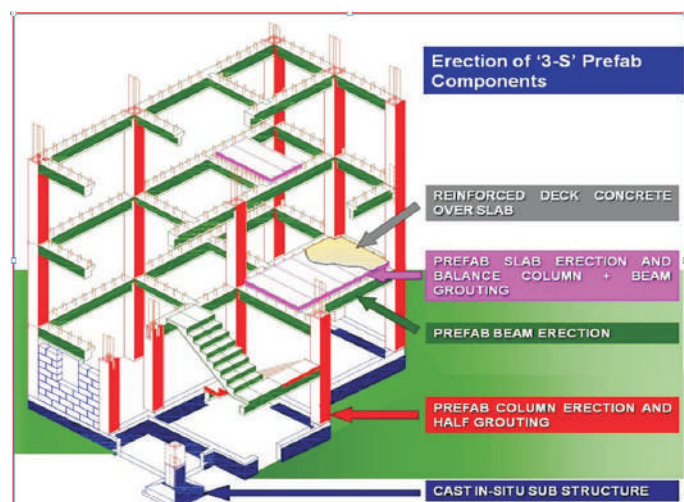
The prefab technology therefore has to be adopted, keeping in mind the need for conservation of fast

depleting natural resources, environment protection, ecological balance and sustainable development in line with the concept of green building. Precast concrete construction has been globally accepted as faster, superior & cleaner system of building. Hence, it is imminent that any established & tried, tested, proven precast concrete technology should be adopted to achieve a faster pace of construction for mass and affordable housing in India.

**Tried, Tested And Proven 3-s Prefab Technology:**

**(a) Technology:**

SHIRKE Group is the pioneer of Prefab Building System, using factory produced precast structural components for building construction since 1972. With Herculean efforts, unique unflinching dedication and supreme self-sacrifice, SHIRKE Group has achieved the transformation of civil engineering by its total industrialization and developed Prefab Technology for Mass Housing. '3-S' is the brand name of prefab building construction system, which is developed and perfected by SHIRKES after years of strenuous Research and Development supplemented by extensive field trials. The system is branded as '3-S' (S-Strength, S-Safety, S-Speed) since it fulfils end users ultimate need of owning a dream house, which is strong, safe, and available in shortest possible time at affordable price. SHIRKES have developed total technology for effective implementation of this '3-S' system of building construction for Mass Housing Projects. The '3-S' system is successfully used for the last about 43 years in India & abroad and have constructed about 2 lac houses in all types of climatic conditions, heavy rainfall areas and





seismic zones. At present, we are executing mass housing projects in Maharashtra, Karnataka, New Delhi, United Andhra Pradesh, Tamil Nadu etc, using our tried, tested and proven '3-S' Prefab Technology, costing about Rs.7,000 crore.

The technology consists of foundation with conventional methods and superstructure frame with dense concrete hollow cored columns, dense concrete partially, precast beams, lintels, staircases, chajjas etc. and autoclaved aerated cellular reinforced (AAC) Siporex slabs, precast slabs and Siporex blocks for masonry, precast walls. Reinforced screed is provided on slab to have monolithic construction. The Siporex Blocks & Slabs are manufactured in permanent factory and other structural components, like columns, beams; precast wall panels, precast slabs, staircases, lintels, chajjas etc, are manufactured at precast factories established at site under stringent quality control. The precast components are erected, aligned and connected, using self compacting concrete of appropriate grade and secured with embedded reinforcement.

**(b) Successful implementation of Tried, Tested and Proven prefab technology for Mass Housing at Delhi:**

Considering the volume of work, such as construction of about 55,000 houses at Delhi for Delhi Development Authority in a short period of 3 years, we have established the state of the art plant & machinery, which is biggest in Asia. The factory is laid out over 25,200 SqMtr area with Storage/ Stacking area of 46,000 SqMtr for the precast components. Our expert design and project execution team has visited countries all over the world and selected the most modern sophisticated machineries for Prefab Housing Projects, which are as under:

- Automated system for moulding and demoulding of mould sides.
- Specialized vibration system for proper compaction of concrete.
- Automated overhead concrete transport & pouring system.
- Specialized magnetic shuttering.
- Specialized equipment for concrete surface finishing.
- Arrangements for modern ways of curing by hot water circulation, curing chambers and sprinklers etc, which require less water and give efficient curing.
- Specialized tilting, lifting and transportation equipments for early age concrete components.
- Most modern reinforcement steel cutting and bending machines.
- Reinforcement bar decoiler and straightening machine.
- Automatic slab and wall cage welding machine.
- Slab and wall cage bending machine.
- Automatic column cage welding machine (Capacity – 250 SqMtr/Hr).
- Automatic stirrup making machine.
- Automatic raft steel binding machine.
- Automatic lattice girder fabrication machine



**Lattice Girder Manufacturing Facility For Precast Slabs (7500 Rmt /day)**

- Computerized weigh batching & mixing plant for concrete.
- High capacity tower cranes for erection of structural components.
- High quality moulds for precasting of slabs, walls, columns & beams. The carousel system adopted for casting the walls comprises of 68 pallets. This reduces the cycle time, thereby increasing the rate of casting the walls.



**PRECAST BEAM CASTING (1800 Rmt/Day)**

### (c) Evaluation of Technology by reputed Institutions:

The Precast Technology (3-S system) has been developed and perfected since 1972 by carrying out field and laboratory tests by many reputed organizations, which are as under:

- City Industrial Development Corporation (CIDCO) has carried out actual performance load test to check the safety and stability of the structure by loading the structure to destruction and found that the structural behaviour was most satisfactory.
- Tests were carried out by Indian Institute of Technology, Mumbai, and they have certified that the joints fully established the behavior in the elastic range with adequate safety margins; absence of any separation cracks or any structural distress in the joints; adequacy of the bare portal to offer resistance to horizontal forces; ultimate load is on the higher side and ductility ratio is more than what is specified and required; joints of the beam column connections have behaved as monolithic, as designed.
- TOR Steel Research Foundation of India has carried out the tests and concluded that there is no distress feature in any of the joints & assembly of precast units is safe for resisting the loads for which they are designed for.
- Tests were carried out by Prof. Haresh C. Shah, Head of Civil Engineering Department, Stanford University, and he certified that the design calculations & detailing of the structure are such that for vertical loads, seismic loads & the wind loads, the buildings should provide safe and desired performance.
- Central Building Research Institute (CBRI), Roorkee, has also carried out tests and experimental results on Full Scale Building Structure and established the desired performance and behaviour of '3-S' precast building system under all design load conditions, including seismic (Zone-IV) for high rise buildings. CBRI

has also certified that protective treatment given to steel reinforcement in Siporex is quite effective compared to corrosion of steel in normal conventional concrete.

### (d) Technological and Financial Benefits:

#### Technological advantages:

- Reduction in dead weight due to light weight precast components is beneficial from seismic considerations.
- Use of fire resistant Siporex products enhances the safety of the buildings
- Thermal insulation properties of Siporex products leads to increased comfort levels inside the buildings.
- Due to use of precast structural members, cycle time required for each floor is reduced substantially.
- Elimination of plaster to precast units, such as slab, wall panel etc., since these components are form finished, which is similar or better than that of a plastered surface.
- Quality is ensured automatically as structural units have BIS (ISI) norm and markings and are manufactured in permanent / site factories with objective quality control.
- Considerable reduction in quantities of natural resources, such as sand, metal, water, wood etc, by optimum utilization of construction materials.

#### Financial Benefits:

- Due to turnkey, saving in planning & design fee.
- Reduction in dead weight results in saving in foundation and frame work cost.'
- Saving in cost due to elimination of slab, wall panel plaster.
- Due to early completion, financial benefits are as under:
  - Saving in interest on investment.
  - Saving in escalation cost
  - Saving in establishment cost
  - Early return on investments
- Cost saving in maintenance due to quality construction.
- Rapid Speed of erection & fast construction, resulting in earlier occupancy & reduced financing cost.

In case tangible and intangible financial benefits are

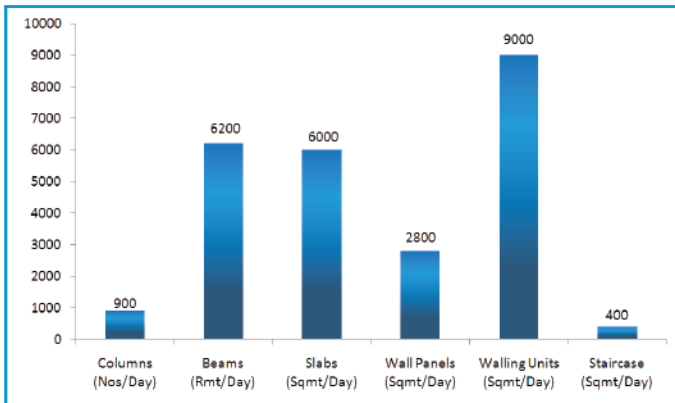


quantified due to technological advantages, there is time saving of 15 to 20% and cost saving of about 30 to 40%.

**(e) Environment Friendly Technology:**

'3-S' Prefab Technology is eco-friendly due to judicious use of construction materials, reduction in wastage of materials, using more durable materials, use of energy efficient building materials, use of products that contribute to a safe, healthy built environment, use of construction system minimizing air, water and noise pollution during construction, use of fly-ash, very minimal requirement of water for construction, non-generation of construction debris, elimination of use of timber / wooden scaffolding, judicious use of scarce natural resources, use of eco-friendly products for walling, flooring and roofing.

**Installed Daily Precast Production Capacity (Pan India)**



▲ Precast Wall Panels (1400 Sqm/day)



**MIG & HIG Housing Project at Kharghar, Navi Mumbai for CIDCO**



**B+s+18 Storeyed Mass Housing Projects For BDA At Dodabanhalli**



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## बांधणी दर्जेदार घरांची, अनुभूती योग्य गुंतवणूकीची

आमच्या आजपर्यंतच्या सर्व प्रकल्पांना ग्राहकांनी भरभरून प्रतिसाद दिला. परवडणारी किंमत (रीझनेबल रेट) व दर्जेदार बांधकाम या दोन सौख्येक तत्वांमुळे आम्हाला हा प्रतिसाद मिळाला. कुठलाही शब्दांचा खेळ न करता व भावनिक साद न घालता किंमत व गुणवत्ता योग्यरितीने दिली की ग्राहक घर खरेदीसाठी भरघोस प्रतिसाद देतो हे आम्ही अनुभवले. याच पार्श्वभूमीवर आम्ही घेऊन आलो आहोत उत्तम गृह प्रकल्प, ज्यातील घरे असतील सर्वांना हवीहवीशी वाटणारी, दर्जेदारपणाची अनुभूती देणारी.



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**GAURAVH**  
CONSTRUCTIONS



## PCERF organised 5 Seminars to create awareness about **Constro 2016** - Smart City concept

### Smart City

#### Seminar 1

Transcribed by: Ar. Arunima Dasgupta

The Constro 2016 precursor lecture series kick started with Dr A. Ravindra introducing the concept of Smart Cities, its aspects and its relevance in the Indian Context. He identified 2 significant events of 2008 and their intersection, which brought about the idea of the concept of a smart city:

1. Urbanisation: Almost 50% of the world's population lives in Urban areas today.
2. Technology: Transition from Wired to Wireless.

India at 30% rate, is behind in terms of its rate of urbanisation as compared to China. However, India faces major challenges like Management of existing resources, inadequate infrastructure, Urban Pollution and most importantly the 'Urban divide' or unequal growth of the Indian cities. This is a serious concern for Indian cities in terms of sustainability. So, are smart cities the answer to these challenges? Digital, Wired, Interconnected are words often associated with smart cities. But what do they translate into? Dr Ravindra uses the following broad points to explain this Western concept:

1. Urban Activity: It is real time, user centred and responsive.
2. Open data apps to inform citizens help

So, are there any existing smart cities? Yes, one of the best examples is Barcelona, Spain which boasts its productive human scale neighbourhoods within a hyper connected, hi speed and zero emission metropolis. Another example is Singapore whose mission is creating a 'smart nation'. India's take as per the Ministry of Urban Development is "A smart city will have to provide a very high quality of life (comparable to any developed European city) to its citizens"

The government has broadly come up with three approaches to create these smart cities:

1. Retrofitting an area of about 500 acres in an existing city within a time frame of 3 years.
2. Redevelopment in about 50 acres of area within a time frame of 5 years.
3. Greenfield or creating a new city altogether in a minimum area of 250 acres over a period of about 10 years. Examples of such green cities include the GIFT City in Gujarat, Kochi Smart City, the 7 proposed Smart cities along the Delhi, Mumbai Industrial Corridor.

Also any city which is termed a smart city needs to be aligned with the Government of India flagship programs like the Swatch Bharat Abhiyaan, Digital India campaign etc.

#### **So what are the major challenges in the Indian context?**

Firstly, the planning process needs an integrated approach towards all aspects like spatial, economic, social and environmental planning. In India, this very aspect of planning is flawed as we follow the Master Plan approach where each aspect is dealt with separately instead of as a whole. This creates problems during implementation and results in a poor output. Secondly, India still needs to work and evolve its technology and make it available to all. Thirdly, is financing. Indian government alone doesn't have the funds for this smart city mission. Funds here largely depend on the PPPs which have both advantages and disadvantages. The main issue being the sustenance of this funding.

Lastly, and most importantly, is the city governance. There are multiple bodies that govern different aspects of our cities. The absence of a clear leadership at city level creates confusion and chaos.

#### **What is our Future Way Ahead?**

1. Co-operative Federalism: Independent powers need to be assigned to the local government.
2. Assign a Political Executive at the city level, who will be answerable to the people.
3. Have an apex planning body which also acts as a coordinating body.
4. Personnel Policy: Lack of professional manpower in the planning bodies leads to improper, incomplete planning
5. Lastly, and most importantly, set priorities for Smart Cities.

## Urban Planning for Smart Cities

### Seminar 2

Transcribed by: Ar. Sapna Bang

The 2nd seminar included Smart Urban Planning- Innovative approaches to city planning, Designing the smart city, Challenges in executing smart aspects in existing cities in India, Urban regeneration.

Mr. Rahul Dalal and Mr. Mahesh W from Studio POD advocated that 'Cities should be planned keeping people first'. They cited examples of Medellin, Columbia and Rio Di Janerio, Brazil. These studies reflect that finding local solutions was more important than following international definitions of Smart cities. They spoke about the 6 mantras while designing Smart Cities:

1. Respond contextually – contextual development of cities
2. Connect Efficiently – street categorisation keeping a people first approach
3. Develop equally - creation of democratic spaces for people
4. Build intelligently – efficient energy and resource management
5. Invest strategically - creation of value adding infrastructure
6. Collaborate actively – creation of a public interaction platform.

The Studio POD has applied these mantras in their Gurgaon project. Smart city planning tools are technology and people. They exhorted the audience to look inside instead of copying Shanghai.

**GIS- backbone for planning smart city by Mr. Aniruddha Hambarde.** He opined that economic development and energy efficiency could be considered as the most apt definition for smart cities. GIS is a tool used to depict geographical information in a geometric manner. A centralised data base for policing, planning and monitoring the city can be obtained through GIS. An example for using GIS is creating an effective public transportation network. The origin-destination analysis, the transport network analysis, location identification tools can help in creating a Transit Oriented Development, which will in turn instigate economic development.

**How it's done- Lessons from best planning practices by Ar. Swapnil Patil.** Ar. Swapnil Patil feels that Information technology is the last piece in the jigsaw puzzle of smart city planning. Giving an example of the Abu Dhabi master planning, he said setting economic and social baseline targets is important. The designers (Urban Planners) should work hand in hand with the implementers (Municipal Corporation). The key themes used for the Abu Dhabi urban planning were:

1. Environment- creation of Urban Growth Boundaries (UGB) to curtail growth.
2. Land use- proper definition of land use.
3. Transportation- from road hierarchy creation to transit oriented development (TOD).
4. Open spaces- creation of a series of hierarchical parks and open spaces.

### As part of Vision Plan Pune, he proposed

1. Transport network with BRT, stations with TOD at every intersection and LRT along river.
2. Mula Mutha – River front development
3. Sangamwadi Bombay Sappers- converted into a CBD
4. Pune Cantonment- converted to a Smart Town
5. Khadki Cantonment- converted into an Administrative District
6. Pune University- made into a World class walkable University
7. Pune Agriculture college- developed as a Urban Agriculture Hub
8. Kharadi- developed as a TOD
9. Green Streets program



## Smart Buildings

### Seminar 3

Transcribed by: Ar. Arunima Dasgupta

The 3<sup>rd</sup> Seminar of the Constro Lecture Series shed light on the evolution and general concepts of a 'Smart Building'. Ar. Vinod Gupta who spoke about his ideas of a smart a building. He began with the CMC Building, Mumbai from the 1990s, is rightfully called the 'first smart building' of India. The client brief for the building had three major points that needed to be fulfilled:

1. Use of Building Automation systems for HVAC, Lighting, Water and electricity, Security and Overall Building maintenance.
2. Make the office a Paperless one.
3. Achieve a building that is relevant in the 21<sup>st</sup> Century. The most important aspect was making the building Environmental friendly, which meant energy efficiency, water use efficiency, use of materials that didn't require extra energy for transport of construction and most importantly creating a healthy working environment for the staff. Ar. Guptaspoke about the innovative creation of levels within the building that created a kind of "slow staircase" and encouraged movement of people without use of elevators. The façade of the building used glass as cladding material to avoid growth of a certain kind of fungus Day lighting was controlled with automated self-adjusting louvers and lights that depended on the sun's position during the day. Use of such systems, coupled with general architectural theories of efficient space usage, proper form generation for the building is what led to the success of the building in a way.

He also spoke about NIIT Campus at Neemrana, Rajasthan and IIT Gandhinagar Campus. An important point raised here is when can we say a building is smart? An interesting way to look at it would be to first think about the human body. It is probably, the smartest thing we know today. It has a large number of systems that are interconnected in a way to ensure its efficient performance. However, not the mere presence of such systems makes a person 'Smart'. Hence smartness is just a label not a goal. People are good only if they have the right values and goals. It is very similar for buildings and architecture as well.

The second speaker was Ar Oscar, principal architect at Oscar and Ponni Architects, Chennai. A smart building is the integration of building, technology and energy systems. These systems may include building automation, life safety, telecommunications, user systems and facility management systems. Smart buildings recognise and reflect the technological advancements and convergence of building systems. They provide actionable information about a building to allow its management.

### Smart Building Timeline

Till 1985: Automatic control function

1986 to 1991: Buildings capable of responding to the changing needs

1992 to present: Buildings with features effectively satisfying the changing needs.

With Innovation, Integration and Empowerment, traditional building automation is elevated to an intelligent building. It provides an efficient and cost effective environment through optimisation of its four basic elements of **Structure, Systems, Services and Interrelationships**.

In conclusion, we take a look at the basic advantages of smart buildings:

- Higher levels of security and safety
- Simplified operation for users and administrators
- Simpler staff tracking
- Reduced administration costs

- Smartcards – single card for security and cash transactions
- Reduced system costs by sharing infrastructure
- Easier integration into university systems
- Information can be delivered to all interested parties in the manner they need
- Increased mobility

In the final lecture Mr Skandaprasad talked about 'Driverless Buildings' like 'Driverless Cars'. Investment in Building Service Split is typically: Structural – 75%, Services – A little below 25% and Automation 2-3%. This small investment can save much energy for the future!

With building management system, anything can be controlled ensuring a safe, secure and comfortable home. The potential for automation in a residence could include Gates, to digital locks for doors, Curtain controls, Lux sensors for natural lighting, and touch screen panels for temperature controls, solar panels generating energy, gas leak detectors, motion detectors and a lot more!

While these systems are handy, it is important to understand when and where to stop automation, else it becomes stupidity not smartness!

Some technologies to facilitate automation include

1. Building Information Modelling (BIM)
2. Diagnostics or self-tuning Equipment for better system performance.
3. Voice: Voice commands on smartphones have proved their advantages.
4. Gestures: Elimination of touch ensures hygiene, safety and comfort.
5. Cloud connectivity: It basically reduces infrastructure, makes connection hassle free.
6. Power over Ethernet: Quick to install, easy trouble shoot and most importantly cost effective.
7. Near field Communication (NFC): Smart phone, where just tapping your phone can do the needful.
8. Energy Optimisation: HVAC optimising with occupancy sensors.

Any building to become smart must hence be primarily designed properly before application of any kind of automation systems.





## Smart Environment for Indian Cities

### Seminar 4

Transcribed by: Ar. Arunima Dasgupta

Dr.SujitPatwardhan, the first speaker stated that Cities today are being called engines of growth and in the next 15 years will contribute to 75 % of the nation's GDP. However, an important question that arises here is,if cities are engines of growth and generate economic benefits, why do experts constantly say that cities can't raise necessary finances for efficient working for itself? Is it because the funds that are generated are being incorrectly used? This is an important aspect and needs some immediate thought.

A Smart city's basic aim is to make it more livable for all. So how to make a city 'livable'? It needs to be Inclusive and not only for the elites, economically vibrant, be sustainable in energy use, water disposal, carbon footprint, provide affordable housing, good access to comfortable mobility with outstanding quality of public transport and non motorised transport, have adequate public spaces, urban greenery, with bio diversity, be safe for all, have a balanced city budget and have transparency in decision making with involvement of its citizens in planning and delivery.The Indian government has identified similar requirements with additional parameters for a smart city. While the "What" is defined, the "How" is obscure. Lack of this answer is hampering proper execution.

The second speaker, Ar.ChitraVishwanath of Biome, shared her insights and experiences in designing sustainable environments in partnership with architecture, water and waste. She declared Indian cities have always been smart; however, the citizens today, who have become insensitive and un-smart. Continuing Dr Patwardhan's question,ArVishwanath inquires "Who" will create and maintain the Smart city. The perception is of a gated city with lack of communication and lack of equality.

Some projects by Biome, on the lines of sustainable architecture, were inspired by masters like Ar. Baker. The use of simple, locally available materials like compressed mud, brick, bamboo transformed the output of a building's sustainability quotient, keeping intact its 'Indian-ness' and overall comfort and feel. Interesting architectural inputs like use of filler slabs, arch panelled roofs with precast beams, reduced the overall adverse environmental impact.

The third speaker, Mr. NeeravSaraiya, discussed Rainwater. Water is life and there can be no smart city without proper water management. Rain water harvesting has been made compulsory for any building with area more than 300 SQ. M by the Maharashtra State government and most state governments, however, it is not being taken seriously. He explained about the basic two kinds of rainwater harvesting needed in an urban scale. First, the Rooftop Rainwater Harvesting System and second, the Surface Runoff Rainwater Harvesting System. It is important to remember that recharging is a community project and will benefit the entire community as a whole. DSK Dream City, Pune is an example of planned rainwater harvesting.

Lastly, Dr Sameer Shastri spoke about waste management. His definition of a smart city was quite an interesting one. A smart city manages its resources well, both for its present and future needs. When we look at Waste management, it is quite shocking to note that most of our treatment plants don't function properly with just 30% of functioning plants at national level. So what can be a solution to this? Here we look at Decentralised 'on site' integrated waste management or 'DOSIWAM' where every grain of solid and every drop of liquid is treated by bio-digestive processes and the end products are returned to the soil through agriculture or horticulture in an ecologically sustainable manner. In way we use nature and give back to it at the end. While such systems are primarily designed for rural areas, they can always be retrofitted and redesigned to meet the needs in the urban scape. Incorporating small biogas plants etc in site margins of plots can be a smart start.

## Smart Solutions for Energy Efficiency

### Seminar 5

Transcribed by: Ar. Arunima Dasgupta

The 5<sup>th</sup> Seminar began with Ar Mili Mazumdar sharing an overall view of energy consumption in the building sector along with other important aspects like infrastructure, transport etc in a smart city.

The Residential and commercial building sector contributes to about 30% of the nation's total electrical consumption and is growing at a rate to 12% today. This is quite concerning, however, if properly planned, we do have the knowledge potential to save and reduce this by the year 2021.

The government has already taken quite a few steps to ensure proper energy management in the building sector by implementing various codes like the ECBC, Green rating for buildings (GRIHA), Promoting green buildings etc.

Ar Mazumdar, elaborated the function and importance such codes. The VVIP circuit house and the PNCTDA, Pune which are few of the new examples for a well functioning green building, were seen as case studies for the same.

Next, Ar Ruju Rathod shared insights on Integrating Passive and Active Strategies for energy management through an architectural perspective. We looked at four of her projects that had implemented such strategies.

Simple passive strategies included, Orientation (East West) of buildings and calculating total solar radiation and daylight. Also weighing options in terms of sizing and zoning buildings for large campuses for example single mass buildings vs. multiple buildings with multiple orientations were looked at. Other strategies included increased day lit areas by added courtyards, terraces etc for required spaces. Implementation of such strategies not only reduced energy consumption but also reduced overall cost of building maintenance and provided for better performance of spaces for its users.

The third speaker, Mr Yogesh Khernar looked the topic through the case study of 'Smart Grid Initiative' at Amanora Township, Pune which is Inida's first 'Swadesi Smart City'. The notion of smart grid generally applies only to electricity. A smart grid basically refers to an electricity network that can efficiently integrate the behaviour and actions of all users connected to it. We looked at how a smart grid is basically a micro grid which adds many more components to the system as compared to a normal grid, making it more efficient.

The four major aspects of a smart grid are, flexibility, accessibility, reliability and economic efficiency. These along with the four principles (observable, controllable, automated and fully integrated) are part of the smart grid mission by the Indian Government.

The last speaker, Ar Poorva Keskar, gave a more detailed insight to the Energy Conservation Building Code or ECBC. The ECBC, though an important code, hasn't been mandated in all states as yet. However just declaring a mandate for the code isn't sufficient, proper knowledge about its need is what is going to help its overall success during implementation. The first step towards this would be relooking at the code, re working the climate zones within states to identify which climate zone a region lies in.

An important step was when the ECBC integrated with other green building needs which include other resources like land, water etc. Ar Keskar, explains that a question that arises here is when mandated, who checks the compliance of a building to the ECBC codes? Will it be a local body? In Mahashtra, a 'Third Party Mode; assessor' has been implemented who audits the project at design stage itself. We further looked at the required bench marks for an ECBC compliance and the overall need and importance of the same.

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**KUSHAL :**  
**Making Nation proud at**  
**World Skill Competition, 2015**  
**at Sao Paulo Brazil.**

*India's*  
**Construction Worker**  
*wins big at*  
**International Competition**

**What is World Skill Competition?**

World Skill International is a global organization. Its formation has a very interesting History behind it. In 1945 in the wake of Second World War (& partly owing to rebuilding of war ravaged economies) there was tremendous demand for skilled manpower.

First competition took place in Spain at national level in 1947. But the initiators wanted much more than that. As a matter of fact, they had far-reaching objectives: to motivate youth to compete, to make them enthusiastic about vocational training and to compare skills and abilities of people from different countries.

Due to similarities in language, history and culture, contacts were made with Latin American countries to set up a joint International Competition. The first Iberian Competition, with the participation of 12 young skilled workers from Portugal and Spain had number of observers from various countries and they having been completely seduced with the idea, resulted in Spain inviting youth from Germany, Great Britain, France, Morocco and Switzerland in 1953.

By 1970 competition was not restricted to European continent and made a jump to Japan. Competitors from age 17 to 22 years demonstrate their excellence in a number of different skilled trades and technology contest areas. The competition is promoted and managed by World Skills International, formerly known as the International Vocation Training Organisation (IVTO). As of September 2015, World Skills International



**Team WSC (L to R) Mrs. Purna Astunkar (Expert), Mr. Tikam Singh (Wall & Floor Tiler), Mr. JP Shroff (Expert), Mr. Parshuram Naik (Brick Layer) Mr. Sameer Belvalkar (interpreter), Mr. Kapil Trimal (interpreter)**

has 75 member countries. The most recent competition, WorldSkills São Paulo, Brazil 2015, took place between 11-16 August 2015 at São Paulo, Brazil.

Governed by an international Board of Directors and administered by the WorldSkills Secretariat, WSI's mission is "to promote, through the cooperative actions of Members, a world-wide awareness of the essential contribution that skills and high standards of competence make to the achievement of economic success and individual achievement." The next World Skills Competition is scheduled in Abu Dhabi, 2017.

**Kushal's World Skill Journey :**

Before we take a look at Kushal's World Skill Journey it would be apt to look at Genesis of Kushal, when it all began on 18th December, 2010 the proposal sent to National Skills Development Corporation (NSDC) by Confederation of Real Estate Developers Association of India (CREDAI) Pune Metro was approved and handed by the then Finance Minister Pranab Mukherjee to Former President CREDAI Pune Metro Mr. Satish Magar which





Mr. Dilip Chenoy (Managing Director & CEO of NSDC) celebrates with Mr. Parshuram Naik (Brick Laying Mason Trained by KUSHAL) KUSHAL victory

triggered the starting of Kushal a (No Profit Organisation) NPO. The responsibility of taking the Skilling movement forward through Kushal was given to Mr. J P Shroff a Managing Committee member of CREDAI Pune Metro jointly with the Steering Committee Members. So far Kushal has certified 21936 Trainees (figures as on 8<sup>th</sup> September, 2015). Steering Committee Members are themselves well-established Realtors and are members of CREDAI Pune Metro and they do this activity with Philanthropic motive and genuine desire to improve skill levels in Construction Sector which is sorely lacking in the said sector.

India being a member nation of WSI since 2006, NSDC, its Member Organisation and it mandated Kushal to Select and Train Construction Workers in Construction and Building Technology for skills in Bricklaying and Wall & Floor Tiling. The National Level Skill Competition were conducted in October 2014, in the category of skills Bricklaying and Wall & Floor Tiling. 6 talented youths were shortlisted and began the period of their Training. They were not only given Technical Training but Kushal worked on their Mental and physical fitness which are of prime importance to stand the rigours of such International Competition. Kushal's Steering Committee Members Mr. Madan Thombare & Mr. KavishThakwani's put in special efforts and their unflagging support reaped dividends, as Parusharam Naik & Tikam Singh got selected by NSDC at Finals Selection for 'Team World Skill India' in February, 2015 at New Delhi. This was the first time India was going to test its mettle under the Construction and Building Technology Category.

To get international exposure and to understand what World Skill entails it was decided to contest Regional competitions conducted under auspices of World Skills International so it was decided to participate in World Skill Oceania in April, 2015. Both the boys, won Bronze medal and the takeaway for Parusharam Naik & Tikam Singh - who participated in Bricklaying and Wall & Floor Tiling respectively - got exposed to international standards of benchmarks, processes and procedures, cross-learning from other trades as well as fellow competitors, different ways of doing same thing, comparison of outcome and usage of state-of-the-art equipment in doing their job. Their achievement was recognized by the Prime Minister on inaugural World Youth Skills Day on 15<sup>th</sup> July, 2015.

Mr. J P Shroff as Expert & Mrs. Purna Astunkar were given the responsibility of Training Parshuram Naik & Tikam Singh respectively. Machines and equipments were imported so that contestants could practice on the state-of-the-art equipments, so were special Bricks and Tiles ordered for the sake of practicing on Test Modules. All this was done with expeditious approval given by Mr. Rupesh Banthia, Treasurer Kushal. It was important that an actual site was available for the training practise. Mr. Ranjit Naiknavare, Vice-chairman Kushal offered his under-construction site 'The Spires' to be used for during the entire span of activity. The site and logistics were really useful for the successful completion of the training.

Parusharam Naik & Tikam Singh from being Construction Workers to Skill Ambassadors Parusharam Naik who won



(From L to R) : Mr. J P Shroff, Expert Bricklaying, Mr. Kapil Trimal, Interpreter – Wall & Floor Tiling, Ms. Purna Astunkar, Expert – Wall & Floor Tiling, Mr. Sameer Belvalkar, Interpreter – Bricklaying

Medallion for Excellence in Bricklaying hails from Mehboobnagar in newly carved state of Telangana, being a not-so-developed region his parents migrated in search of better opportunities and livelihoods to Pune as





Parshuram Naik with Medallion for excellence for Bricklaying

Construction Labourers, he too started working as Construction hand to support family income, his relatives are Contractors in Construction industry with this humble background he was spotted by Kushal at Training Site and thus began his World Skills Journey which not only took him to New Delhi for 'Team India World Skills' Selection by NSDC at Pragati Maidan, in February, 2015 he later on won Bronze Medal at World Skill Oceania a Regional competition under aegis of World Skills International held at April 2015 in Hamilton, New Zealand. He took the confidence working tirelessly with the guidance of Expert Mr. J P Shroff & Interpreter Mr. Sameer Belvalkar he went on improvising and won Medallion for Excellence at 43<sup>rd</sup> World Skill Competition, Sao Paulo Brazil in Bricklaying. He was among the 8 Medallion for Excellence winners from India.

Tikam Singh's background is also not very different except that he belongs to family of farmers from Chikharu Village in Bharatput District (Rajasthan) and his family is dependent on him for the income that he sends back home as Construction Labourer with Siblings also to support for. He did very well in National Level Skill Competition in October 2014 conducted by Kushal and thereafter he along with Parusharam had identical journey to World Skills Competition, he was guided in his effort by Expert Ms. Prerna Astunkar & Interpreter Mr. Kapil Trimal, the only differentiator is that Tikam Singh's performance could not fetch a medal for India though he made a valiant effort so much so that he completed Test Project in the given time.

All this is no small achievement if viewed from the angle that this was India's debut contest under Construction & Building Technology.

The two boys did perform exceedingly in light of this being India's debut at World Skills stage though Tikam Singh could not win any Medal he could complete Test Project in record time. Parusharam's success is luminous and exemplary in the light of the 27 contestants from countries like Australia, Austria, USA, Germany, Denmark, Netherlands, UK, Italy, France, Belgium in the contest area of Bricklaying besides the socio-economic conditions unlike India is much better so are the Training, Infrastructure facilities, robust apprenticeship program etc.

New Peaks & New Horizons beckon Kushal

Kushal shall definitely reprise & better success at next World Skill Competition in 2017 at Abu Dhabi with the experience it has gathered in recently concluded international Skills Contest. MCCA, FICCI, CSDCI have already taken notice of the success. Not just restricting itself to up skilling construction Workers it intends to showcase that there is definitely a career path in Construction Skills with Parusharam Naik and Tikam Singh as "Skill Ambassadors" and Role Models which should inspire more of such Parusharams & Tikams to come forward and Make India & Construction Fraternity Proud and transform skill scenario in the Construction Industry. Kushal is all too eager to bring the Transformation!!



**KUSHAL** is a partnership project between CREDAI Pune Metro (Confederation of Real Estate Developers Associations of India) and National Skill Development Corporation (NSDC) to address the issue of shortage of skilled workforce in the construction industry. The trades being Shuttering, Bar Bending, Masonry, Tiling, Plumbing and Painting.

Kushal has been pioneer in creating a unique on-the-job skill-training program for construction workers.

In about 3 years, Kushal has developed a unique and successful model that helps construction workers to learn while they earn and has trained and certified more than 18,000 construction workers till date. This program has done wonders for construction industry. The construction worker has earned skills that have helped them progress faster and earn better by increase in their wages and socio-economic status. Contractors who have a skilled workforce can produce more with less. Developers now have construction sites where wastage is minimal, construction quality is high and customers are content.

The project aims at reducing the existing gap between the demand and supply of skilled manpower. This is achieved by

- ◆ On-site Training-.Skills related to technical expertise, safety and productivity are imparted. Kushal model consists of 80% on-site; 20% classroom based training, thus practical oriented.
- ◆ USP of KUSHAL; training the workers in an EARN-WHILE-YOU-LEARN scheme

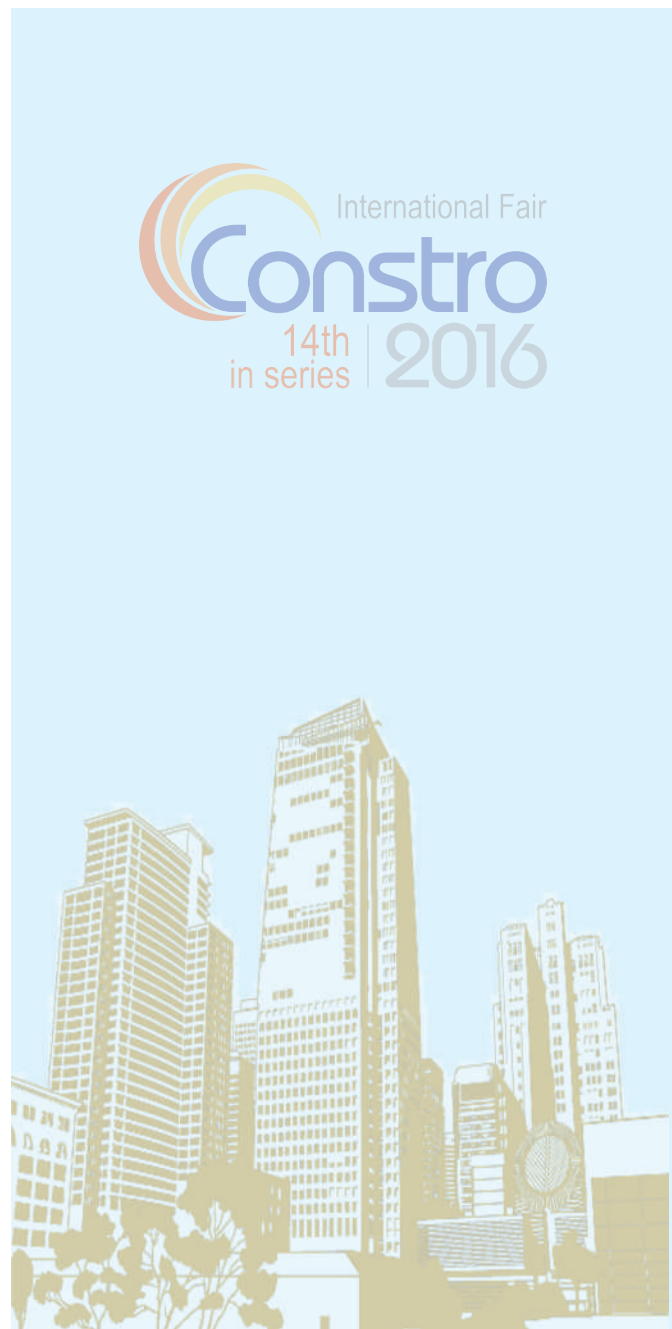
Kushal has developed Audio Video Films on each trade viz.Barbending, Shuttering, Masonry, Tiling, Plumbing, and Painting. A separate soft skills trainer is hired to impart soft skills to workers, which is sine-qua-non to these workers lives!A mobile Training van with external as well as internal projection and audio system and Portable Tab with in built projector have been introduced as innovation in technology for imparting training.

**Train the Trainers:** A regular programme by professionals is organized with the help of Builders Association of India (BAI),Construction Quality Rating Agency (CQRA) and PCERF.Course content is professionally developed. Trainee and trainer manuals are prepared by experts and approved by NSDC.

Kushal has tied up with Central Bank of India for assisting the construction workers in opening saving accounts. This initiative of KUSHAL is noteworthy and seeing this Central Bank of India has relaxed the KYC norms of account opening for construction workers. Till date more than 5000 accounts of construction workers have been opened already, even before the Prime minister's Jan Dhan Yojana announced last year.

Mr JP Shroff has been the Chairman of Kushal since its inception i.e July 2011. He has been a driving force for all the activities in Kushal. He is a Governing Council member of the Construction Skill Development Council of India.

Under his able leadership Kushal is growing by leaps and bounds.His unparalleled dedication to this unique project has helped Kushal gain recognition at national and international level by winning several prestigious awards.





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## Traditional Materials And Techniques In Conservation

*Kiran Kalamdani*

*Practicing Architect and Conservation Expert*

### 1. Industrial Revolution And The Reduction Of Traditional Material & Techniques

Coinciding with the advent of the industrial revolution came reinforced concrete on the scene of the Indian Construction industry is a trend that was indeed quite negative and disturbing that can be easily traced to the quick fix materials called cement and mild steel as well as fossil fuel based materials. Traditional wisdom about



**Debashish Nayak And Agk Menon At The Kesarjan Building Centre**

materials like stone, brick, wood, lime, terra cotta and metal gradually became redundant or at best sparingly used. While speaking on these trends in the worldwide construction industry Leon Krier (Architect from Luxembourg) said in New Delhi in 2007, '....Modern movement has undermined craftsmanship and prompted the loss of traditional wisdom acquired over many years of evolution. This is not a romanticised lament for a time and era gone by but a logical rational ecological and ethical way of building that is in tune with the culture and climate of a place.....' The Indian subcontinent that is fast losing its traditional skills in

natural materials is once again yearning for an ecological salvation in the name of sustainability. Carbon footprints, embodied energies and several new parameters of measuring sustainability are being invented and practiced on a daily basis and yet the environment of our cities and towns is rapidly deteriorating under fossil fuel fired monsters. In such a climate (correction climate change) the call for a revival of traditional materials and techniques may seem against progress, regressive or even retrograde. However the number of examples where such techniques and materials are employed is on the rise. Very slowly as the conservation movement gathers momentum the knowledge base about the ecological value, human familiarity and cultural appropriateness of traditional materials is being echoed in contemporary buildings.

### 2. OF 'NIRMITHI KENDRAS' 'KESARJAN' 'NIRGUDE' 'TULSHIBAG' and the like...

A one day national conference in Ahmedabad in 2014 convened by Architect Keerti Shah, where building workshops on the lines of the Hudco Building Centres that were set up two decades ago in 650 places in India and only 40 of these survive mostly in the southern parts of the country called 'Nirmithi Kendras' were discussed and their possible future deliberated on. (In Bijapur one such Kendra has an annual turnover of about Rs 30 Crores which deals with supply of building material, techniques and technologies related to rainwater harvesting and consultancy for small house builders or clients). The Kesarjan building centre where the conference was held supplies readymade hydraulic lime for the 1200 odd buildings listed in Ahmedabad where conservation work in at least 100 of them is in progress. In the 7000 strong village of Nirgude in Junnar Taluka by the foot of the great Shivneri Fort where Chatrapati Shivaji was born the village folk donate a day's work of the bullock to drive the mortar mill for scientific

restoration of the 250 year old Hanuman Temple. The Conservation of Tulshibag in Pune recently made use of lime concrete and lime mortar to repair the basalt stone flooring of the one acre heritage precinct at a cost of over a crore of rupees.

### 3. Skill Set Requirement And Availability In The Context Of Heritage Conservation

One of the cornerstones of the Indian Conservation Movement is the availability and universal presence of crafts-persons and the continuing age-old skill-sets in the various life support systems. Our rapidly transforming cultures where traditional methods are fast-changing in favour of modern and industrialized products and processes, heritage conservation provides patronage and sustainability of the crafts. It is not only one of the greenest ways of building but also of retaining the lessons and some mistakes of the past so that we may not repeat them.

### 4. Factors Affecting Conservation of Stonework And Stone workers:

The gradual decline in the size of stonework across the 2000-year span is as interesting to note as it is remarkable and has a direct implication on the conservation of structures. From the 10-14 feet long stones of the Yadava period,

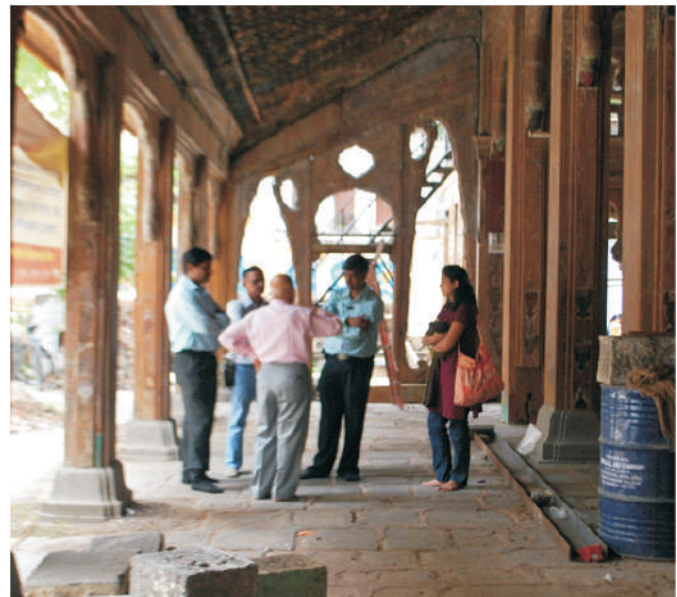


**Conservation Of The Central Balcony At The Deccan College By Basalt Stone Workers**

to the 4-5 feet long stones of the Bahamani period, to the 2 feet long stones of the Colonial Period to the 9 inch long stones in the post independence period is not only a story of reduction in size but also of strengths and values of each period architecture. Selection of Basalts and

traditionally known places for their craftsmanship that are closely located near the quarries is a feature of the building activity. Newasa near Ahmednagar, Chinchwad, Baramati and Kanhe near Pune; Malad stone in Mumbai, Roha near Alibag, Ajanta Village near Ajanta, Verul village near Ellora are some places where these communities have settled and have developed a working wisdom on the subject. Their training, skill certification and award programmes are impending issues in the evolution of this craft.

'Wadars' and 'Patharvats' are communities that traditionally work on this type of stonework. They are part of the System of 12 Balutedars (traditional craft guilds) comprising of carpenters, weavers, blacksmiths, coppersmiths, cobblers etc. The availability of patronage and level of craftsmanship has standards and terminology that has evolved over the years that needs to be understood and acknowledged in the



**Conservation Of Timber Work At Tulshibag Ram Mandir, Pune**

process of conservation. The socio-economics of the community and their diversification into other allied trades of building is a factor that affects availability and hence conservation. Moreover these materials and skills are becoming popular even in the landscape and new building technologies. Along with these aspects there are several aspects that deal with the weathering or deterioration, their study, documentation leading to better practices in future.



Deterioration of stonework that is affected by agents of weather, biological agents or the nature of stone needs to be demonstrated through various documented examples including cases of bad repairs, wrong techniques and good examples. Use of various plasters, mortars and renders in traditional as well as modern contexts need to be explored to document old practices and establish new working methods.

The various earthquakes that have done damage to standing structures and methods used for repair or prevention of damage also need to be documented with examples.

### 5. Craftsmanship and Allied Uses of Stone:

Often the material has found use for sculpture or utilitarian objects in and around the building that has enriched human experience. These have helped in the sustenance of the craft despite the decline in the use of stonework as a building material. With the resurgence of revivalist and nostalgic practices in the building industry, there is an increasing demand for stonework and stoneworkers.

### 6. Architectural History of The Deccan Timber work:

The rock-cut caves in the Western Ghats and the Central Indian ranges illustrate and imitate the use of timber for vaults in the Chaitya Halls, the largest of its kind being at Karla near Pune. Very few specimens survive from these dates which may be attributed to the lack of repair and conservation techniques or the aggressive presence of termites and such agents actively preying on the cellulose found in wood fibres.

There are virtually no examples of Yadava period architecture and that of the Five Bahamani States of Bijapur, Golconda, Bidar, Berar and Ahmadnagar. Aurangabad and its fort of Daulatabad that displays five hundred years of stonework shows only a few floors in timber that have remained good for the last 300 years are in need of repair and conservation.

The Maratha period saw a significant phase of the building activity that was greatly influenced by the traditions established by the Bahamani patrons of architecture. Its study will cover a range of structures from temples, wadas, samadhis, gadhis, fortresses and

other urban structures that extensively used timbers. Work on Shaniwarwada, Nanawada, Vishrambagwada in Pune, and case studies of Sarkarwada Nashik; wadas and temples of Phaltan Near Satara, Palaces of Satara forms a basis for the illustrative examples.

The colonial period that brought about a major paradigm shift and a completely different set of considerations for timberwork is illustrated through examples of work documented or executed. Timberwork restore at St. Paul's Church, Pune, 'The Club, Mahabaleshwar', Main Building, University of Pune, and the Mahatma Phule Mandai are some examples where the successful use of timber that has lasted for over a century and with due care can continue to stay good for at least another one if not more.

### 7. Factors Affecting Conservation of Timberwork:

Linseed oil, cashew nut oil & other such oils that was largely used to preserve wood was the most effective traditional preservative till until recent times. Lately the use of various respiratory poisons (wood guard), sealants and impermeable coatings (Enamel paint, Polyurethane based 'Touch wood' and melamine polish) has played havoc with traditional timberwork.



### Structure At Shaniwarwada In Timber And Burnt Clay Tiles

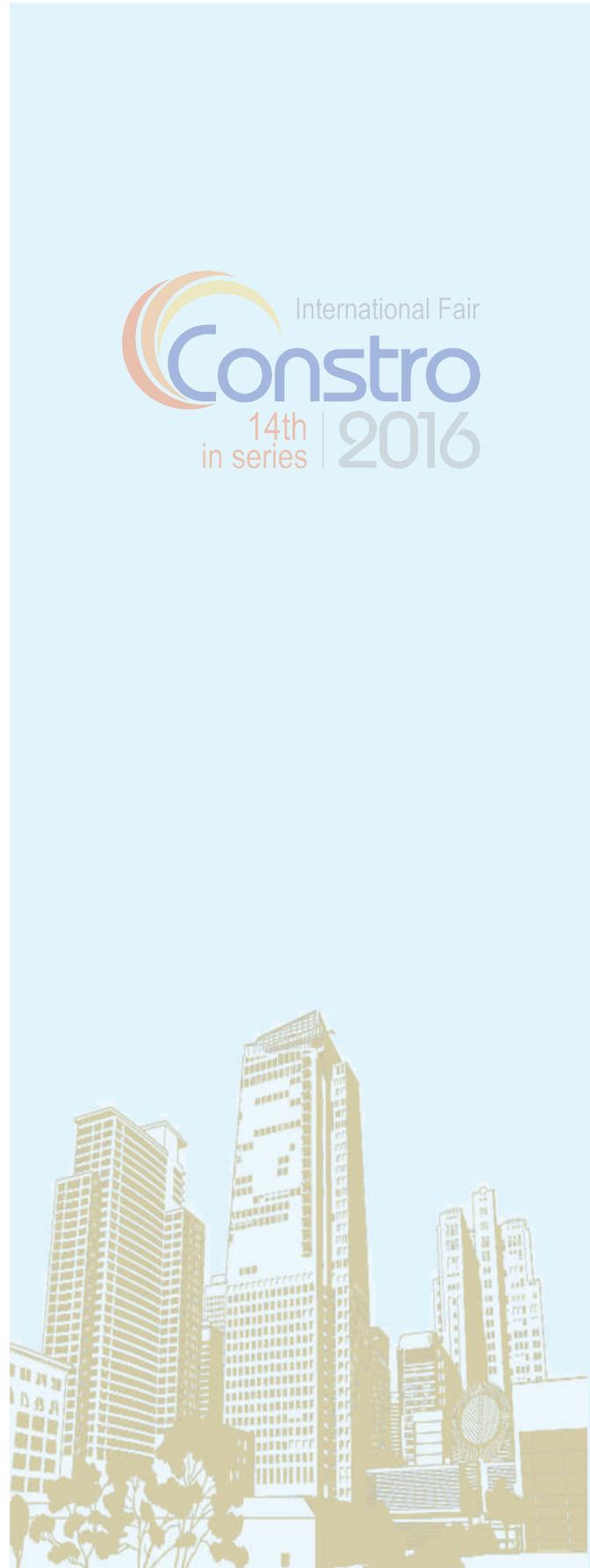
Deterioration of timberwork that is affected by agents of weather, biological agents or the nature of timber needs to be studied through various documented examples including case of bad repairs, wrong techniques and good examples. Use of various joinery, nails and screws, holdfasts and fasteners in traditional as well as modern contexts needs to be explored to document old practices and establish new working methods.

**8. Future Trends Attitudes and Policies**

Compared to the scenario about twenty years ago the demand for conservation of structures and the use of traditional skill sets has grown and it will probably grow with the fast disappearing traditional vernacular. Architects and Engineers will have to upgrade their knowledge awareness and particulars that relate to these skill sets and they would also have to devise methods of measuring qualities and quantities to improve on these inheritances. They hold the promise for a richer and more complete construction industry.



*Basalt Stone Worker Carving a Stone Base for a Timber Column at Tulshibag Ram Mandir*







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## Build Green, not necessarily Green Building!

*Avikal Somvanshi*

*Architect and Author with focus on Sustainability*

There is a growing obsession among governments across the federal structure of the country to offer sops of extra and free built up area and fiscal incentives to push the developers to opt for green rating of buildings raises deep concern. Governments are doing this based on goodwill and industry lobbying without serious evaluation of intended benefits and unintended consequences.

The question is, can or should private green rating systems become regulatory tools for environmental performance of buildings? This has made analysis of the policy interface with private rating systems necessary to see if the system is designed to be transparent, accountable and effective in order to deliver on intended objectives. Currently there are no independent, transparent and accountable oversight system for monitoring of the actual resource savings and environmental performance of the green rated buildings in the country. This makes performance-based appraisal necessary to ensure there are no unintended consequences.

Moreover, there is a larger question regarding the merit of co-opting green rating in the policy framework. If most buildings are mandated by law to implement a range of regulatory measures for resource savings and environmental performance, what extra do the green rating systems provide? If the ratings are the minimum benchmarks then why should a few buildings qualify for incentives for implementing the same measures under a rating system?

As a policy research and advocacy think tank we at the Centre for Science and Environment (CSE) took up the evaluation of the current rating practices supported by policies to unbundle these policy questions. But before answers to these complicated policy questions could be there were other questions that loomed large.

What are the green claims of the buildings rated under

different rating systems and ranks? How are the rated buildings performing? Who is evaluating them and where are the records? How does their performance data look compared to that of conventional buildings? What difference has the rating made to their actual resource and environmental performance?



But this seemingly harmless inquiry was met with blank stares. In short, there are no measurable data available in public domain or with the civic bodies or government agencies doling out taxpayers money in form of green building incentives.

### **Lack of transparency**

Currently there are three green building rating providers active in India. Leadership in Energy and Environmental Design (LEED) certification which was developed and copyright of US Green Building Council was offered by Indian Green Building Council (IGBC) till last year and is now offered by Green Building Certification Institute. IGBC has now independently developed and is doing green building ratings directly under its own name with 1,328 registered projects. Third system is Green Rating for Integrated Habitat Assessment (GRIHA) developed by The Energy and Resource Institute (TERI) and administered by GRIHA Council.

The review of the publicly available information, with the aim of assessing how accountability and transparency have been built into the system to implement the incentive programme, found the system highly opaque. In 2012, we released our first study pointing to the lack of transparency in the functioning of both GRIHA and IGBC. Thereafter, IGBC started a performance monitoring section on its website which provides annual electricity and water consumption details, voluntarily disclosed by 50 rated buildings. The GRIHA website provides design descriptions and projected savings of its rated projects, but it stops short of displaying any substantial



performance information about the rated buildings.

We revisited the study both last year and this year and found not much improvement in level of opaqueness. The rating agencies continue to be reluctant in sharing performance data. The IGBC has not been updated its performance monitoring section since January 2014. GRIHA shares limited data on request but not publicly on the grounds that that they are contractually bound not to share the audit reports of projects. Similar response was given to us by USGBC representative when asked to share performance data.

### Exemplary green requirements?

In the assessment of the requirements of the green rating systems it was found that most requirements are part of already existing the legal requirement for all buildings. For example, under GRIHA version 3 rating buildings get points for meeting rules under the Environmental Impact Assessment, National Building Code and Energy Conservation Building Code along with eco-sensitive zone regulations, coastal zone regulations, heritage areas, water body zones rules, various hazard prone area regulations, among others. But these rules are legal requirements and should be met by all buildings irrespective of whether they are rated or not. In fact, any standard building that meets the legal requirement under various provisions of existing laws can qualify for 2 to 5 star of GRIHA rating.

It is also strange that government's own energy rating system developed under star labeling of the Bureau of Energy Efficiency (BEE) has not been considered for incentive by any state government. In fact, such a practice was initially considered in Punjab, Delhi, Noida but it was eventually dropped.

### Green is not green enough!

We reviewed the data put out by the IGBC as part of their performance monitoring initiative under which energy and water consumption data of large commercial buildings that were rated and awarded silver, gold and platinum rating, under their green rating programmes was made publicly available.

The annual energy consumption data of these 50 rated buildings was analysed. The objective of the analysis was to find out if the rated buildings, once they are operational, can meet the requirement of the star labelling programme of BEE. To everyone's surprise it was found that more than half of them were under-performing. More than one-third did not even qualify for even one star label of star labelling system of Bureau of Energy Efficiency.

This trend is quite consistent with the global trend. Even

in the US LEED rated buildings were found to be under-performing. But this has led US LEED to reform its system and demand annual audits of all rated buildings. But these reforms have not found support among Indian rating systems.

### Incentives and accountability

West Bengal recently joined the club of governments that have promised extra built up area to the developers and washed off their responsibilities by put the entire onus of monitoring, reporting and certification on rating agencies. The compliance is based entirely on self reporting by builders and rating agencies without independent official oversight. There is a clear case of conflict of interest but people in-charge have turned a blind eye. Other members of this club are NOIDA in Uttar Pradesh, Rajasthan, Punjab.

West Bengal government has gone ahead to notify a staggering 10 per cent extra FAR incentive for GRIHA and IGBC rating. The penalty for non-compliance is weak. There is no official oversight. State governments that have given incentives do not maintain record of green credentials and resources and energy savings of these buildings enjoying the official incentives. In fact, in NOIDA, UP, even if building projects merely sign up to get rated under GRIHA and LEED can get extra floor area ratio (FAR). In response to a RTI from us the NOIDA authority responded saying that they have no official record of how many buildings have availed of green buildings incentives. Yet NOIDA gives one of the highest sops of 5 per cent FAR.

### Design vs performance

All the incentive programs have build in penalty for non-compliance based on periodic re-assessment of the building's green credentials. NOIDA had originally demanded this assessment to be carried out every three years but later increased it to five years. But there is no clarity on how this assessment will be carried out and who will carry this out. West Bengal has even linked penalty for under-performance to self reporting.

Interestingly, proponents of the green rating systems have been arguing that buildings are rated for their design and should not be judged on performance. In fact there is no requirement for performance under the new construction rating systems under which all the incentives are given out. CSE after investigation learned that a building will practically never be stripped off its new-construction green label even if it is found to resource guzzling as it is awarded for the design of the building and not performance.



## The Importance of ISO

*Ar. Mrinalini Sane*

*Practicing Architect and Academician, ISO Lead Auditor and consultant*

ISO stands for International Organisation for Standardisation. ISO as an organisation is based in Geneva. It was formed with the consent and cooperation of governments of many countries and important industry personnel. The idea of formation of such an organisation was to create a base level that will define the MINIMUM requirements for any organisation to work as per the Internationally accepted expectations. This would facilitate easier trade and commerce that would commence after the Second World War!

The work for searching such standards commenced by looking into history – shipping! It was critical that prior to leaving the safety of the harbour, the ship is adequately prepared to identify and deal with any potential problems that may affect the ship in the middle of the ocean! This meant preparing elaborate plans that will work in the absence of any external help. This concept of “prepare or perish” was important for survival. Subsequently, numerous documents that were already in existence were studied. The first document of compilation that was ready for use was created in 1987 – the ISO 9001:1987. Here, the 9000 series indicates QMS or Quality Management System.

An important and interesting aspect of the Standard, is

that it is Dynamic. The first version created has undergone changes and modifications that reflect the changing needs of the world. The current version that is valid is the ISO 9001:2008 which as of date will also become invalid after ISO 9001:2015 comes into force. Today, the draft of ISO 9001:2015 has been released which is under discussion. This will be the fifth version.

Over a period of time, some limitations of QMS were felt. As a result, more specialised Standards came about. Hence, over a period of time, the ISO 14000 series dealing with EMS or Environmental Management System was initiated. Today, ISO 18000 series dealing with OHSAS – Occupational Health related and ISO 22000 series dealing with Food Safety and ISO 27000 series dealing with Information Security are present today.

Some features about QMS that are common sense based!

An organisation can exist only if it has a product or a service for which there is a customer. So Customer Satisfaction is paramount. On the other hand, we know that “Change is the only Constant”. Hence, Customer expectations and requirements change and the organisation's ability to service the customer also changes. To be aware of these dynamics, one must



become consciously aware of areas where Improvement is possible – and implement the improvement as a conscious decision. So we may say that Continual Improvement and Continued Customer Satisfaction are the two tracks on which the ISO system leads the organisation. This may be seen to be the desire of every organisation!

#### How does QMS work? Some obvious and simple methods used are

- Focus on planning
- Learning from mistakes, feedback
- Not mere documentation, but ANALYSIS
- Analysis offers solutions to problems

Hence, adopt for SELF – IMPROVEMENT  
To offer CLIENT SATISFACTION

#### Some basic facts about ISO Standard:

- The standard is generic
- The standard is dynamic
- It is Suitable for all organization types – proprietorship, partnership, LLP etc.
- It is Applicable to all categories – manufacturing, service sector, trade
- Organization size is of no constraint – a single person or a multi-national company

This means that any organisation of any type, undertaking any work in any location is eligible for obtaining ISO certification. The current ISO Standard has certain mandatory clauses which, if they are suitably fulfilled, make the organisation eligible to obtain the International Certificate.

#### Now let us come to the benefits of ISO 9001:2008.

- ✓ International acceptance: since this certificate is issued by a Certification Body, which itself undergoes periodic accreditation, it means that a) the certificate is valid across all commercially active countries of the world and b) the certificate is issued by an authority which is recognised across the world.
- ✓ **Benchmarking:** the organisation is expected to set its own desired levels or benchmarks and follow them. They may vary from project to project or client to client. However, compliance with ISO requirements is compulsory.

- ✓ **Consistency & accuracy:** consistency of performance with defined level of benchmarking ensures that work takes place on a “first time right” basis – leading towards much-desired accuracy.
- ✓ **Quality awareness:** understanding what is defined as quality, communicating the same to the concerned persons, resulting in suitable procedures which when followed, creates quality awareness.
- ✓ **Responsibility definition:** it is extremely important that responsibilities are identified and communicated to the concerned persons. It is similarly important to ensure that there are neither overlapping areas of responsibility definition nor “no-man's land” of responsibility definition. This ensures smooth communication across the organisation.
- ✓ **Credibility:** If the client is satisfied, then the organization earns priceless goodwill. This will lead to improved prospects for the organization.

All these benefits will accrue to the organisation when the organisation decides to adopt ISO norms. It would be good if these are adopted as a voluntary activity. For this purpose, the ISO consultant and ISO auditor is present and available to help the organisation. They will teach the organisation personnel how to use this Tool of Improvement. An important pitfall that one must guard against is the perception that ISO certification automatically leads to improvement. The certification merely indicates the organisation's desire and ability to USE the Tool.

Hence, benefits will reaped by the organisation when the personnel led by the Top Management will adopt consciously and voluntarily the requirements set about by ISO.





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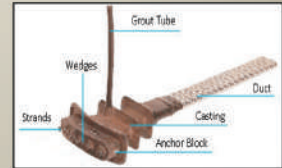
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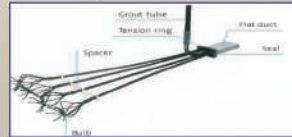
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## Construction Safety

*Prof. Mujtaba Lokhandwala*  
 Convener, Construction Safety Forum, PCERF



Construction Safety has been on the radar of PCERF since a long time, but was taken up with the seriousness it deserves in the year 2011, with a seminar on the subject. As a part of the deliberations, it was decided to constitute the Construction Safety Awards. A detailed audit system was designed to take care of all possible scenarios. The objective of these awards is to enhance the awareness about safety and to educate all the stakeholders. Over the period, the learning of the Jury has been incorporated and the document and the system has evolved.

The assessment takes in place in two parts. Part 1 is the assessment of the system and the organization in place. Part 2 is about the actual implementation on the

ground. This assessment takes place over 2 visits to the site. The first visit is announced in advance and Part 1 and 2 are both assessed, with a subsequent written feedback to the participants. The second visit is a surprise visit, to assess the implementation as on a day to day basis. In this visit Part 2 is only assessed and the reality of the implementation of the safety measures comes out clearly.

PCERF is pleased to share the audit system, without weightages, as an effort to bring the information to all those who would like to take it up in earnest. This is meant to be a guideline and is not exhaustive, by any means.

### Part 1 Safety Management System Assessment

Sr. No.	Document	Yes	No	Remarks
1)	Safety Policy statement			
2)	Safety manual / Method statement			
3)	Safety Organisation Chart			
4)	Emergency Response Plan			
5)	Manuals of various machinery			
6)	Test Certificates			
7)	Certificates – Quality / Safety			



**Assessment of Safety management system**

Sr. No.	Particulars
1)	Safety Policy-Content & Effort taken to educate the site personnel
2)	Safety – organization / committee – If yes what is ratio of members from Management, Contractors and workers
3)	Hazard identification & Risk assessment (HIRA)
4)	Is job safety analysis done at site?
5)	Safety Manual / Method statements manual- How elaborate? Does it cover all work activities on site? Effort taken to educate people about the same.
6)	Safety Promotion-What Effort has been taken? How effective? Interest of both Management & Employees
7)	Contractor Evaluation Systems and its effectiveness.
8)	Incident Control –Systems to control, System to report, Monitoring, Effectiveness of the system.
9)	Investigation of incidents and accidents-Findings and implementation of control measures to prevent incidents / accidents in future.
10)	Training – in house, external, regular, analysis for need for training.
11)	Monitoring & Review of Safety Management System
12)	Is Vision & Mission Displayed on site. Are roles, responsibilities and authorities clearly defined and communicated?
13)	Is there a Site Safety Induction System for visitors, clients, vendors, and all others?
14)	Is there a system to communicate HSE information and alerts to all employees(other sites)
15)	Is there a system of internal / external safety audit and implementation of control system



**HS & E Meetings**

Sr. No.	Particulars
1)	Are HS&E meetings with prepared agenda and are they of sufficient duration?
2)	Are documented minutes of meeting available for review? Are action plan prepared.
3)	Do the Project Manager and Site Engineer review and sign meeting reports to ensure appropriate actions identified in the meeting are addressed.
4)	Do Company subcontractors attend and participate in relevant HS&E meetings?
5)	Are Client and Client subcontractor personnel encouraged to participate in relevant HS&E meetings?
6)	Are tool box talks conducted prior to start of work each day?

**Part 2 Physical Site Assessment****1. EMERGENCY PROCEDURES**

Sr. No.	Particulars
1)	Has the site been assessed for various hazards that may give rise to an Emergency Situation?
2)	Does the site have an Emergency Response Plan (ERP). Is it sufficient and known to all?
3)	Are there Fire action & First Aid information notices on sites & offices?
4)	Are there enough and appropriate Firefighting equipment available on locations?
5)	Is there enough trained personnel to response (Fire fighters & First Aiders)
6)	Are the emergency plans well co-ordinated with Civic authorities and hospitals?

**2. EXCAVATION:**

Sr. No.	Particulars
1)	Have specific hazards pertaining to excavation been identified and communicated?
2)	Are there adequate control measures are in place for the hazards identified?
3)	Does the site have properly designed and maintained support systems on site/ are the sides of excavations battered back to the correct angle of repose?
4)	Is there a Safe secure access to the excavation?
5)	Are there sufficient / appropriate barriers in place to stop persons accidentally falling into the excavation?

Sr. No.	Particulars
6)	Has a competent person assessed stability of adjacent structures near excavation work?
7)	Does the site follow a safe procedure for handling / storage / blasting activity?

**3. VEHICLE SAFETY-ON SITE**

Sr. No.	Particulars
1)	Have risk Assessments / Method Statements been completed and made available to all concerned
2)	Are separate pedestrian and vehicle routes provided to prevent any untoward incident.
3)	Is there a system in place to check road worthiness of the vehicle entering the site?
4)	Are ground guides used to control vehicle movements where necessary. Are turning areas provided to minimize the need for reversing?
5)	Vehicles have been provided with reversing warning horns.
6)	Are parking areas clearly marked?
7)	Is there is system in place to verify the competency of drivers? Do they follow defensive driving norms on and off site?

**4. SCAFFOLDS:**

Sr. No.	Particulars
1)	Is there a Method Statement available for erecting, working & dismantling of Scaffolds and made available to all concerned parties?
2)	Is there a competent person on site for all work associated with scaffolds?
3)	Does the site follow safe scaffold erection procedures?
4)	Is there a safe access provided to the scaffold? Have guard rails and toe boards have been installed in accordance with best practices?
5)	Is there a Tagging system in place and is it known to all concerned personnel?
6)	Are all personal being given formal training on safe erection, working & dismantling of scaffolds?





**5. LADDERS:**

Sr. No.	Particulars
1)	Are all ladders on site inspected, maintained and used under a competent person?
2)	Is there a safe working procedure while working on ladders / near power lines?
3)	Do the ladders extend the correct distance above the working platform?

**6. WORKING AT HEIGHTS:**

Sr. No.	Particulars
1)	Has the site been assessed for all activities at heights and method statement made available to all concerned?
2)	Are control measures adopted at site are adequate and effective?
3)	Does the site have adequate harnesses and safety lines? Are these checked prior to use?
4)	Is appropriate training been undertaken to cover all front line workers?
5)	Is proper access and egress provided to all working areas?
6)	Is prompt rescue plan available (Trained personnel, equipment & practice)?
7)	Are all anchors points tested/marked as per Industry best practices?
8)	Does the site implement permit system for Working at heights?

**7. MATERIAL HANDLING (MECHANICAL & MANUAL)**

Sr. No.	Particulars
1)	Has the site been assessed for all LIFTING activities and method statement made available to all concerned?
2)	Have all personnel using lifting equipment (lifting gear and lifting appliances as detailed in procedure) been trained in its use, rigging practices, load handling methods, equipment's capabilities and defects likely to arise in service?
3)	Is lifting equipment found unsuitable for use removed from service and destroyed or repaired, load tested and authorized for use?
4)	Is all lifting equipment examined by a competent person as per the regulation? Is a register of all lifting gear maintained?
5)	Are all lifting machines inspected and approved by a competent person prior to arriving on site?

Sr. No.	Particulars
6)	Are all lifting machines operated by trained operators?
7)	Is there a maintenance schedule for all lifting machines
8)	Is there a Lift plan for all lifts carried out/ any other method to ensure safe lift?
9)	Is there a method to avoid back injury while manual lifting?

**8. ELECTRICAL SAFETY**

Sr. No.	Particulars
1)	Does the site have method statements for all electrical work and are they implemented?
2)	Electrical work performed by qualified electricians?
3)	Are ladders and steps used for electrical work made of non-conductive materials?
4)	Are portable electrical equipment including flexible cables and cords, regularly maintained through planned maintenance?
5)	Have measures been adopted on site to protect personnel from electric shock?



**9. HOT WORK SAFETY**

Sr. No.	Particulars
1)	Are all hot work assessed and method statement made available to all concerned?
2)	Is there a designated area for carrying out hot work and has it been designed and maintained as per best industry practices?
3)	Is there a permit system in place & followed?
4)	Canteen facilities are provided and maintained
5)	Is there a crèche on site and maintained well?
6)	Is there a system in place for regular medical examination of various diseases? Record to show the same.
7)	Campaign to create awareness regarding Occupational health hazards in the Industry.
8)	Is the labour accommodation, safe, hygienic and well maintained?



**10. HEALTH & WELFARE**

Sr. No.	Particulars
1)	Have toilets been provided as per regulations?
2)	Changing and drying facilities are provided and maintained
3)	Drinking water is provided and tested periodically?
4)	Canteen facilities are provided and maintained
5)	Is there a crèche on site and maintained well?
6)	Is there a system in place for regular medical examination of various diseases? Record to show the same.
7)	Campaign to create awareness regarding Occupational health hazards in the Industry.
8)	Is the labour accommodation, safe, hygienic and well maintained?

**11. PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Sr. No.	Particulars
1)	Are all provided with necessary PPE
2)	Are all PPE suitable for the task & hazards identified?
3)	Are PPEs available for visitors?
4)	Are all PPEs inspected for their functionality and service life?
5)	Are personnel trained in use of specific PPE

**12. ENVIRONMENT CONCERN AND CONTRIBUTION**

**A. Waste and Spillage Management**

Sr. No.	Particulars
1)	Is waste properly segregated into biodegradable, plastics, metals and chemicals?
2)	Is the spillage plan and kit in place and communicated?





**B. Debris Management:**

Sr. No.	Particulars
1)	How many items of construction waste have been taken care of (such as – cement, steel, wood, concrete, plywood, debris, bricks & blocks, empty bags, water, diesel etc,)
2)	Are stocking and collection areas marked?
3)	Is debris segregated into Sand /Metal/ Brickbat etc.?
4)	What is done to prevent debris mixing with soil? (Use of plastic sheet)
5)	Are they rolling the balance debris for re-screening?
6)	Has extra labour been appointed for collection and separation of debris? (Supervisors and labour)
7)	Have records about details on debris quantity generated / reused / recycled and transported and expenses incurred been kept?
8)	What is the % of savings on site by adopting debris management?
9)	Reuse of screened material in work. Cube test for concrete items M20 made out of debris material.
10)	Recycling of material in different items. Any innovative method used?

**C. Water Management:**

Sr. No.	Particulars
1)	Has the site adopted gravitational curing by temporary water storage and piping?
2)	Has the site used overhead water tank with temporary piping for curing purposes on all floors.
3)	Have MSEDCL readings and / or working hours of pump recorded?
4)	% of saving in water and electricity. or
5)	Has hydro pneumatic pump arrangement been done for curing?



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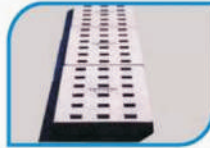
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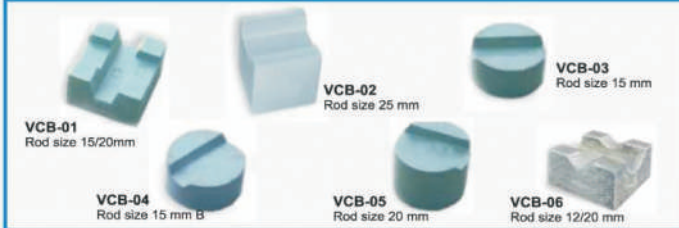
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## WATER MANAGEMENT IN SMART CITY PUNE

*Jyoti Panse*

*Practicing Architect and Water conservation Expert*

We read everyday about some news related to 'water' in the news papers. Sometimes it is about depleting water level of the ground water, sometimes it is just 10 TMC water in dams- hence water cut, and sometimes water mafia. As we all know very well that ,water is the most essential part of our life, like air. In the olden days the daily living was very simple, hence consumption of water was barely 50lit per person per day. But as our living standard improved, the water demand went up. Now more & more water is required for new bathroom gadgets such as rain showers, massage showers, tub bath , Jacuzzi, swimming pools etc. It's a well known fact that better the living standard more is the water need! Now it is pertinent to check the demand & supply - that is how much water we have for today and for future generations and how much we really need!

Actually establishing a 'urban water cycle' is the foremost part of any water management. What is urban water cycle? It is to lift water from the river for urban population for their daily need, purify the water, distribute to the population through reservoirs, pipe lines and to collect back waste water through drains, treatment of waste water and leaving it back to the river. There are many villages, towns, cities, industries and farmers on the downstream of the river. To ensure good quality water is important for downstream population and also for aquatic life in the river, which is diminishing day by day.

The second important part of Urban Water is equitable distribution. The local authority should supply quality water & quantity as per the standard norms and its

equitable distribution in the city. It needs proper distribution by pipes, construction of reservoirs to cover the spared of the city, Leak proof supply, uniform water pressure to all, equal water supply to every citizen. Establishing this entire water network is expensive, on the contrary what we pay to the authority is meager. Use of water meters is inevitable in near future. If someone wants to use more water he will have to pay more!

If we talk about Pune city, we have ample water. As per national water standard 135 lits per person per day (lpcd ) is needed supply, but on the contrary 320 lit per day per

person is supplied by the city authority, which is far more than national standard. However in some parts we get 80 lpcd and in some parts it is 350 lpcd. The problem is inequitable distribution, less no of reservoirs, leakages in pipes and water theft. It has to be controlled & curtailed, which is possible only if monitored digitally without any intervention of public,

leaders, officers & authorities. Everyone will get equal ,same quality and same quantity water, monitored by digital machines. The citizens will have to pay as per bill regularly. The billed amount will be collected and used for improvements and maintenance of the water systems.

The water we have is sufficient for todays and tomorrow's population but what about 2030. It is predicted that by then , 50 % of our population will stay in cities. Will our water be sufficient for population then ? The Singapore is the best example to follow in this context. The city state was importing water from



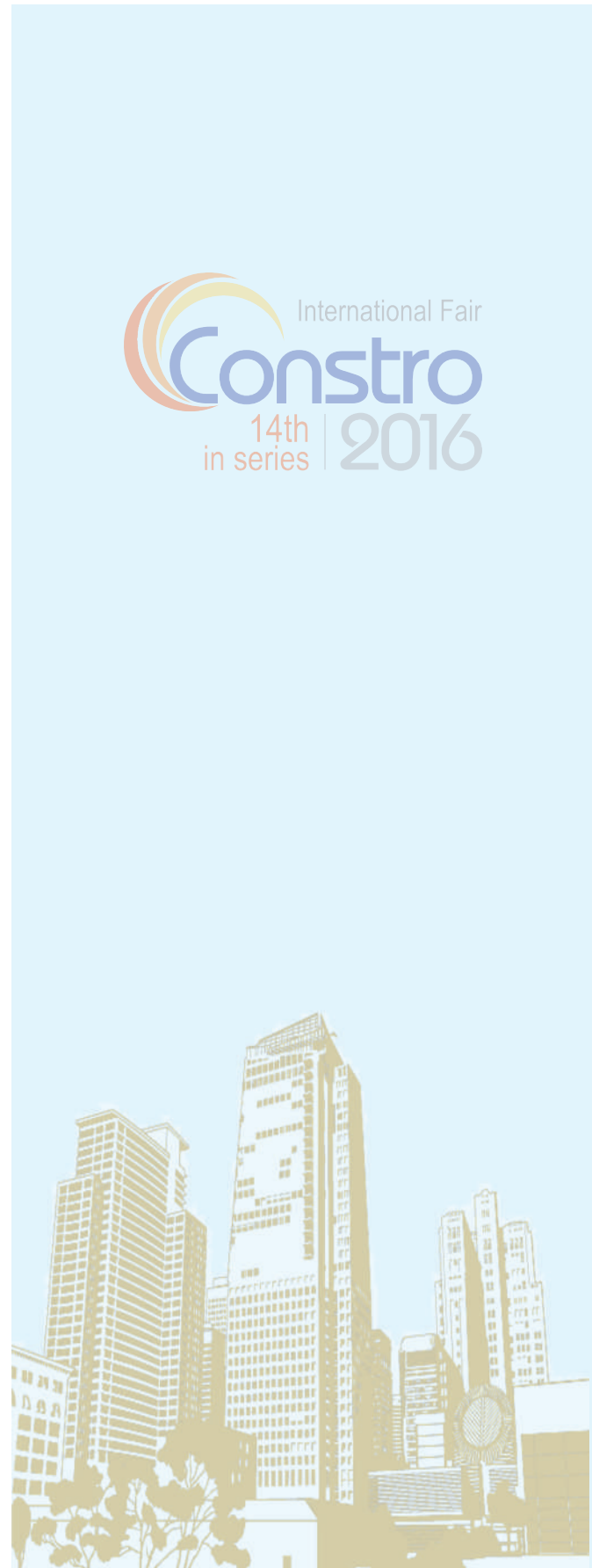
Malaysia for a long time, but expenses started growing on water. So it was decided to collect every drop of water and use it as a source. They started collecting rain water from terraces of buildings, airport runways, roads etc. It was also decided to desalinate 25 % of water of its entire demand. And lastly 10 % of treated waste water is reused . All this together is the drinking water source in Singapore, an ideal example of reuse & recycle! They call this water as 'NEWater'. The water treatment plant is spic & span and all measures are monitored strictly. They have plan ready of water supply till 2060. In future, we may need to tap other sources of water to fulfil the thirst of our ever growing population.

British brought technology of construction dams, collection and then distribution. But before that the water supply was always through wells and rivers. People used to fetch water and store it for everyday use, with some planning & management. Then the taps came at the door step of every household and we forgot about water management. We lost affinity with water. So nurturing our water sources became beyond our imagination ! And then we started thinking that water is our right and we must get it !

When Pune Municipal Corporation conducted a survey of citizens priorities for 'smart city', majority of them selected 'water' as most essential thing for better living, and then came traffic and garbage.

In the 'smart cities' everything is digitally linked for instant information & solutions for smooth functioning of day to day services and problem solving in advance in case of crisis. It is also essential for the e-governance. Every city bill is paid by the card which is linked to your saving account. If you are breaking the traffic rule the police will take your card number and the amount will be deducted from it. The same is applied to bus tickets, water meter bill payment and like every activity in the city. On the mobile you can monitor the quality of water supplied to you this week. Every ward office will work actively in the areas of distribution of water, preparation of bill, collection of money, repairing and maintenance of piping work flowing in that area & treatment of waste water.

It is said that there will be severe water crisis in 2020. So let's prepare ourselves by better water management for future !





## Towards a New Craft Tradition

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The coppersmiths, locally known as the Tambats, originally came to Pune from the Konkan region. They found their skill useful in a number of applications ranging from making ammunition to items of religious use. With time, their skill developed into a craft and their mallet work became their unique identity. The community prospered and at a time there were more than hundred families engaged in the craft. The community lived in the Kasbapeth quarter of the city where they also had their religious and social institutions.

With the advent of modern materials, technology and lifestyles, the items that the Tambats produced started becoming obsolete. They also could not compete with mass produced copperware. They lost their buyers and markets and hence their numbers dwindled. The new generation started to look towards newer occupations and there were hardly anybody from within or without the community who came to learn the craft.

One may wonder what the problem is in losing an obsolete craft. The problem is that the craft is hardly obsolete. What one does with the craft may be obsolete, but not the craft itself. And that is the mistake we make in so many cases! A craft has an intrinsic capacity to reinvent as per changing times. It only takes creativity and a little support for it to undergo this transformation.

Traditional Indian cities have been shaped by the communities residing there and their unique living and working patterns. Communities were defined by their castes which in turn defined their occupation. Each community formed its own cluster in the city and built houses and work places that suited their lifestyle. A city was thus an agglomeration of these community clusters and therefore with a specific built fabric.

With the breakdown of the relationship between a community and a particular occupation, this organisation of the city broke. It was replaced by a more general zoning based organisation based on nineteenth century planning concerns in Europe. Existing Indian cities were difficult to adapt to these concerns and without an alternative system in place became more and more chaotic and degraded. But more than the fabric of the city and its planning concerns, the subject of this article is the nearly lost occupations that the cities supported.

Of the basic twelve occupations that a traditional Indian village supported, metal craft was of particular importance. Here, we are focussing particularly on copper craft or copper smithy that once flourished in the city of Pune.





The Indian National Trust for Art and Cultural Heritage (INTACH) has been working with the Tambats of Pune for more than ten years with the belief that this craft has the capacity to still be relevant in the current times and sustain its practitioners financially. After understanding the craft, craftsmen and their potential, and undertaking a thorough research into the current craft markets, INTACH saw a niche for this craft in the high end designer items category. From then on started a quest of redirecting the craft towards this direction. The first steps included holding design workshops with contemporary product designers to develop early prototypes of a new product range that could be made by using this craft. Skill upgradation workshops were held simultaneously. Various kinds of markets were tested for these products. When there was enough confidence gained and a definite direction set to take this experiment to the next level, Forbes Marshall offered a generous financial support for this endeavour. This enabled a smooth supply of raw material, development of new product ranges, upgradation of techniques, exploration of new markets, product promotion, etc. It also enabled development of soft skills for the craftsmen, forming their co-operative, establishing a brand identity for their collective and sending them to various cities for exposure. This project has given such an impetus to this craft that today, there is a marked increase in the income of craftsmen engaged in this project. Most importantly, the younger generation of craftsmen have started believing in the ability of their craft to support them and their families with a respectable livelihood. They have also grown confident of their craft and are trying new things on their own. They are today confident to talk to designers, interior architects or connoisseurs and open to experimentation. Craft revival is a long process, but here, a definite start has been made.

The building industry can play a big role in reviving traditional crafts. Metal craft, especially, can find a lot of applications in this field. Right from hardware to fittings,



cladding panels to roofing sheets, laser cut designs to inlay motifs and light fixtures to plumbing fittings- everything is possible to be made in copper. It only takes a creative mind and the effort of working beyond one's comfort zone to incorporate these crafts in contemporary practice.



The role of government agencies plays a crucial role in this revival process. A lot of our local crafts are still not registered with the government as official crafts and therefore remain out of the ambit of benefits offered by the government to the craft and the craftsmen. Recognition as a craft opens up certain niche markets and places of exhibitions. It offers benefits like insurance to the craftsmen. It supports skill upgradation workshops. Recognition of the precinct of this community as heritage provides them with guarantee of tenure, stalls their uprooting and preserves their linkages in the city that ensure their livelihood and support systems. An additional benefit is that such areas become potent tourist destinations and if managed properly can bring in additional income and recognition to the community.

Craftsmen, of all kind, are a part of any city's citizenry. They have a right to a respectable living. They have a right to be recognised as bearers of our heritage. And thereby, they have a right to receive active support and encouragement to carry this legacy forward. A smart city is one that builds on its past not one that buries it. It is one that uses traditional knowledge and skills of its citizens and not one that condemns it as dated. It is one that builds an identity for itself from its unique characteristics and not one that aspires to conform to the majority. It is therefore not a misplaced expectation that such a smart city will have definite plans to revive Indian crafts of all kinds- crafts which were at one time the backbone of the Indian economy and still retain the potential of massively contributing to it.

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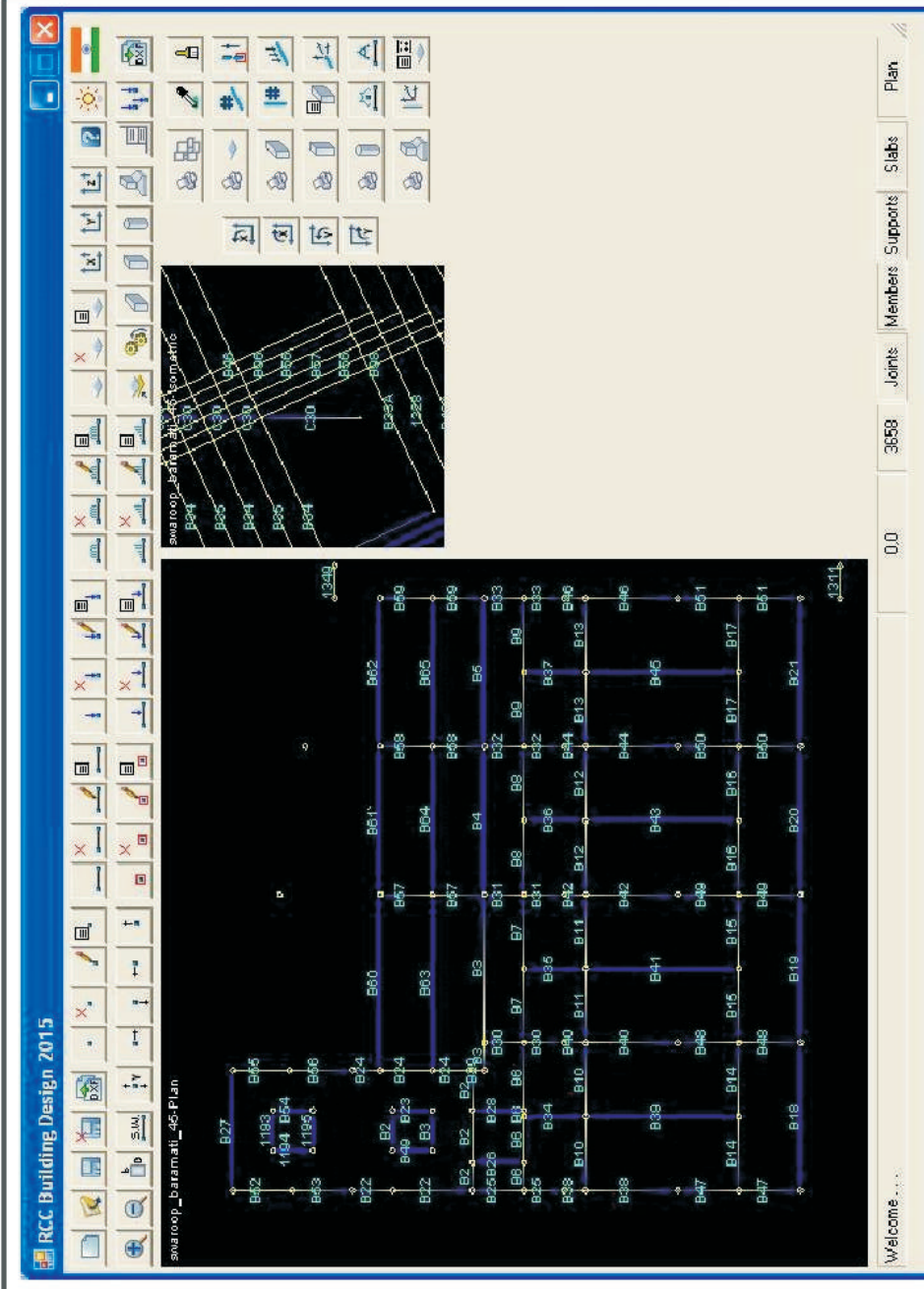
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