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ஆசிரியர் மடல்

அன்புடையீர் வணக்கம்

முல்லா நஸ்ருதின் அன்று காலை மணமுடித்த தனது இளம் மனைவி மற்றும் உறவினர்களுடன் ஒரு படகில் தனது ஊருக்கு திரும்பிக்கொண்டிருந்தார். அனைவரும் மகிழ்ச்சியும் உல்லாசமுமாக இருந்தனர்.

திடீரென கடல் கொந்தளித்தது. அலைகள் ஆர்ப்பரித்தன. படகில் இருந்த அனைவரும் பயந்து அலறினர். தங்களை காப்பாற்ற கடவுளை வேண்டினர். முல்லா மட்டும் புன்முருவல் மாறாமல் அமைதியாக இருந்தார்.

அவரது மனைவி முல்லாவிடம் "என்ன இப்படி அமைதியாக இருக்கிறீர்கள் " என்று சந்தேகம் வினவினாள். முல்லா சிரித்தபடி தனது வாளை உருவி அவளது கழுத்தில் பதித்தார். அவர் மனைவி அமைதியாக இருந்தார். முல்லா "உனக்கு கத்தியை கண்டு பயமாக இல்லையா" என்று மனைவியை கேட்டார்.

அவள் "நான் எதற்கு பயப்பட வேண்டும். நீங்கள் என் மீது அன்பு கொண்டவர். என்னை காப்பாற்ற வேண்டியவர். நீங்கள் எப்படி எனக்கு தீங்கு செய்ய முடியும். உங்கள் கத்தியைக் கண்டு எனக்கு பயமில்லை" என்றாள்.

முல்லா, "அதுபோல்தான் கடவுள் என் மீது அன்பு கொண்டவர். எனக்கு என்ன தேவை, என்ன செய்ய வேண்டும் என்பது அவருக்குத் தெரியும். இந்த கத்தியைப் போல்தான் கடல் கொந்தளிக்கும் இந்த சூழ்நிலை. கடவுள் என்னை காப்பாற்றுவார் வழி நடத்துவார் என்ற அசைக்க முடியாத நம்பிக்கை எனக்கு இருக்கிறது. நான் எதற்கும் பயப்படுவதில்லை" என்றார்.

சிறிது நேரத்தில் கடல் கொந்தளிப்பு அடங்கியது. அனைவரும் மகிழ்ச்சியடைந்து கடவுளுக்கு நன்றி கூறி பயணத்தை தொடர்ந்தனர். முல்லா அப்போதும் புன்முருவலுடன் அமைதியாக பயணித்தார்.

கேடும் பெருக்கமும் இல்லல்ல நெஞ்சத்துக்
கோடாமை சான்றோர்க்கு அணி - திருக்குறள்

நன்றி
அன்புடன்
மு. மோகன்

மய்யத் தலைவர் மடல்

வணக்கம்

Industrial Safety & Health Directorate, தமிழக அரசு சார்பாக தென்னக மய்ய உறுப்பினர்களுக்காகவே தொழில் பாதுகாப்பு மற்றும் சுகாதாரம் பய்றிய பயிற்சி முகம் நடத்தப்பட்டது. இதில் 60க்கும் மேற்பட்ட கட்டுனர்களின் பொறியாளர்கள் மற்றும் கண்காணிப்பாளர்கள் கலந்து கொண்டனர். இந்த பயிற்சி முகாம் மிகவும் பயனுள்ளதாக இருந்தது.

தமிழக அரசின் பொதுப்பணித்துறை சார்பாக Preliminary Meeting on Schedule of rates பற்றிய கருத்தரங்கில் தென்னக மய்யம் சார்பாக கலந்து கொண்டு கருத்துக்கள் தெரிவிக்கப்பட்டது.

Advance Water Proofing Technology for Terrace & Bathroom பற்றிய பயிற்சி முகாம் Pidilite Industries நிறுவனத்துடன் இணைந்து நமது சொசைட்டி அலுவலகத்தில் நடைபெற்றது. இதில் 70க்கும் மேற்பட்டோர் கலந்து கொண்டு பயனடைந்தனர்.

அக்டோபர் மாதம் 16,17 மற்றும் 18ந்தேதிகளில் House Hunt Expo-2015 (Property Show) நடைபெறவுள்ளது. அதில் உறுப்பினர்கள் தங்களுடைய வீடு மற்றும் வீட்டுமனைகளை கண்காட்சியில் அறிமுகம் செய்து அனைவரும் பயனடையுமாறு கேட்டுக்கொள்கிறேன்.

நன்றி
அன்புடன்
O.K. செல்வராஜ்

பவள விழா நினைவலைகள்

R. இராதாகிருட்டிணன்

அகில இந்திய கட்டுநர் சங்கமாக உருவகப்பட்டு (Builders' Association of India) நமது சங்கம் அகில இந்திய அளவில் மெல்ல மெல்ல உறுதியான அடித்தளத்தோடு வளர ஆரம்பித்த காலக்கட்டம் 1960 மற்றும் 70 களில் என்பது நினைவில் கொள்ளத்தக்கது. 1964ல் அகில இந்திய அளவில் 850 உறுப்பினர்களாக இருந்த எண்ணிக்கை 1981ல் 1224 ஆக உயர்ந்தது என்பது குறிப்பிடத்தக்கது. இந்த எண்ணிக்கை 1989ல் 8380ஐ தொட்டு அப்போதைய உச்சத்தை தொட்டது. அந்த வருடம் அடியேன் அகில இந்திய தலைவராக இருந்தேன் என்பதை பணிவுடன் தெரிவித்துக்கொள்கிறேன். அன்றைய காலக்கட்டத்தில் ஒரே ஆண்டில் 502 நிரந்தர உறுப்பினர்கள் சேர்ந்தனர் என்பது அன்றைய காலக்கட்டத்தில் ஒரு பெரிய சரித்திர நிகழ்வு என்பது குறிப்பிடத்தக்கது. அந்த ஆண்டில் தென்னக மய்ய உறுப்பினர்கள் எண்ணிக்கையும் 1228 ஆக உச்சத்தில் இருந்தது என்பதை நாம் மகிழ்ச்சியோடு நினைவு கொள்ள வேண்டும்.

மேற்குறிப்பிட்ட வளர்ச்சியின் காரணமாக நமது சங்கத்தின் சட்ட திட்டங்கள் (Constitution) மாற்றி அமைக்க வேண்டும் என்று முடிவு செய்யப்பட்டது. வளர்ச்சிக்கு ஒப்ப சட்ட திட்டங்கள் அமைந்தால்தான் சாமான்ய கட்டுனருக்கும் சங்கத்தின் செயல்பாடுகள் சென்றடையும் என்று அந்த நல்ல முடிவு மேற்கொள்ளப்பட்டது.

அந்த முடிவின்படி பெரியவர்கள் கூடி ஒரு சட்ட திட்ட வடிவமைப்பு குழுவை நியமித்தார்கள் அந்த குழுவிற்கு திரு. R.G. காந்தி தலைவராகவும் உறுப்பினர்களாக திரு. R.M. சோக்ஷி, திரு. H.J. ஷா, திரு. அமர்ஜித் சிங் சௌத்திரி, திரு. ராகவேந்திரராவ், திரு. G.K. ஷெட்டி போன்றவர்கள் நியமிக்கப்பட்டனர். இதில் திரு. G.K. ஷெட்டி நமது மய்யத்தை சேர்ந்தவர் என்பது குறிப்பிடத்தக்கது. அன்னார் நமது மய்யத்தின் தலைவராகவும் பிறகு நமது சங்கத்தின் அகில இந்திய துணைத்தலைவராகவும் இருந்து சங்கத்திற்கு பெருமை சேர்த்தவர். அகில இந்திய 8வது மாநாடு 1977ம் ஆண்டு சென்னையில் நடைபெற்ற போது அந்த மாநாட்டுத் தலைவராக இருந்து பணி ஆற்றியவர் திரு. G.K. ஷெட்டி என்பது குறிப்பிடத்தக்கது. அந்த மாநாட்டின் சிறப்பைப் பற்றி பின்வரும் கட்டுரையில் விரிவாக உங்களுக்கு சமப்பிக்கப்படும் என்பதை உறுதி கூறுகிறேன்.

அந்த சட்ட திட்ட வடிவமைப்புக்குழு அகில இந்திய அளவில் அனைத்து உறுப்பினர்களின் கருத்தினை அறிந்து சென்னை, கல்கத்தா, டெல்லி போன்ற நகரங்களுக்கு நேரில் சென்று முன்னோடி மூத்த உறுப்பினர்களின் கருத்துக்களை பரிசீலனை செய்து திருத்தி அமைக்கப்பட்ட சட்ட வடிவத்தை திரு. R.G. காந்தி அவர்களால் 1975ம் வருடம் ஜனவரி திங்கள் 18ம் நாள் நமது சங்கத்தில் சமர்ப்பிக்கப்பட்டு புதிய சட்டம் நமது மேலாண்மை குழுவின் ஒப்புதலோடு நடைமுறைக்கு வந்தது.

புதிய சட்ட வடிவமைப்பின்படி 1978-79 திரு. அர்பன்சால் அரோகா 'Shri Harbanshall Auroca) அவர்கள் நமது சங்கத்தின் அகில இந்திய தலைவராக தேர்வு செய்யப்பட்டார். இந்த சட்டவடிவின்படி தலைவரை பொறுப்பாளராக கொண்டு சங்க நடவடிக்கைகள் அமையப்பெற்றன. அகில இந்திய பொதுக்குழு மற்றும் செயற்குழுக்கள் முடிவின்படி சங்கம் செயல்ப்டத்துவங்கியது என்பது குறிப்பிடத்தக்கது. பொதுக்குழு சங்கத்தின் செயல்வடிவத் திட்டங்களை தீர்மானிக்கும் (Policy making body) குழு என்பது சட்டத்தின் மிக முக்கிய அம்சமாகும். பொதுக்குழுவின் முடிவின்படி 20 உறுப்பினர்களை கொண்டு ஒரு மய்யம் துவக்க ஒப்புதல் அளிக்கப்பட்டது. நமது சங்கம் Registered itself as a Charitable Trust and also under the Societies of Registration act. அந்நாள் முதல்

கொண்டு நமது சங்கத்தின் வரவு செலவு கணக்கு ஆடிட் செய்யப்பட்ட Charity Commissioner மும்பாய் அவர்களுக்கு வருடா வருடம் சமர்ப்பிக்கப்பட்டது.

புதிய சட்ட வடிவமைப்பிற்கு பிறகு 1978 ஆம் ஆண்டு நடைபெற்ற சங்க மகாசாபை கூட்டத்தில் தென்னக மய்யத்திலிருந்து பெருவாரியான உறுப்பினர்கள் அன்றைய தலைவர் திரு. நா. காசி விஸ்வநாதன் தலைமையில் கலந்து கொண்ட நிகழ்வு இங்கு குறிப்பிடத்தக்கது. மும்பையில் நடைபெற்ற அந்தக் கூட்டத்தில் தென்னக மய்யத்திலிருந்து சற்றொப்ப குடும்பத்தோடு 50 உறுப்பினர்கள் பங்கேற்ற நிகழ்ச்சி சங்க சரித்திரத்தில் மிக முக்கியமான ஒரு மைல்கல் என்பதை இங்கு பதிவு செய்ய விரும்புகிறேன். திரு. ராசாராம் முன்னாள் அகில இந்திய தலைவர், கார்த்திகேயன் முன்னாள் அகில இந்தியத்தலைவர், அடியேன் உள்பட தென்னக மய்ய உறுப்பினர்கள் பெருவாரியாக கலந்து கொண்ட முதல் அகில இந்திய மகாசபைக் கூட்டம் என்பது இங்கு குறிப்பிடத்தக்கது. மகாசாபை கூட்டதில் கலந்து கொண்டதற்கு பிறகு அஜந்தா, எல்லோரா ஷிரடி, பூனா முதலிய நகரங்களுக்கும் குடும்பத்தோடு சென்ற நிகழ்வுகளும் என் நினைவில் இன்றளவும் பசுமையான நினைவாகத் திகழ்கிறது என்றால் மிகையாகாது. அந்த குழு மும்பாய் சென்ற பொழுது பாந்தராவில் ஆராம் ஓட்டலில் அன்றைய மும்பாய் மய்யத்தின் முன்னோடிகள் குலானி, சோக்ஷி, C.D. மர்க்சன்ட், N.P. பட்டேல், நாராயன்வலேச்சா போன்றவர்களின் பாசமிகு வரவேற்பு இன்றளவும் நினைவு கொள்ளத்தக்கது. அந்த பயணம் தென்னக மய்ய அளவில் ஒரு குடும்ப பிணைப்பை ஏற்படுத்தியது என்பதும் மிக முக்கிய அம்சமாகும். அன்று துவங்கிய அந்த குடும்பப் பிணைப்பு இன்றளவும் தொடர்வது கண்டு மெத்த மன நிறைவு கொள்கிறேன்.

இந்தக் காலக்கட்டத்தில் 1974ம் ஆண்டு நமது தென்னக மய்யத்திலிருந்து திரு. N. நீலகண்டன் அவர்கள் அகில இந்திய தலைவராக தேர்வு செய்யப்பட்டார், டில்லி, மும்பாய் மய்யங்களுக்கு பிறகு அகில இந்தியத்தலைவர் தேர்வு செய்யப்பட்ட மய்யம் நமது தென்னக மய்யம் என்பது நாமெல்லாம் பெருமை கொள்ளத்தக்க அம்சமாகும். அன்னார் தலைமை பொறுப்பேற்று சங்கம் புதுப்பொலிவோடு செயல்பட பெரு முயற்சி மேற்கொண்டார் என்பது குறிப்பிடத்தக்கது. அசாம் மாநிலத்தின் கௌகாத்தி உறுப்பினர் ஒருவருடைய இடர்பாட்டினை தானே நேரில் அரசு அலுவலகத்தில் நியாயம் கிடைக்கப் போராடி வெற்றி கண்டார் என்பது இங்கு நினைவில் கொள்ளத்தக்கது. அவருடைய மணி விழா தென்னக மய்யத்தின் சார்பாக மிக நேர்த்தியாக கொண்டாடப்பட்டது. சென்னை நுங்கம்பாக்கம் தாஜ்கொரமாண்டல் ஓட்டலில் சிறப்பாக கொண்டாடப்பட்டது என்பதை உங்களோடு பகிர்ந்து கொள்ள விரும்புகிறேன்.

திரு. நீலகண்டன் அவர்கள் தலைவராக இருந்த காலக்கட்டத்தில் தென்னக மய்யத்தின் நமது வெள்ளி விழா ஆண்டாக அமைந்தது இங்கு நினைவு கூறத்தக்கது. அதன் வெள்ளி விழாவினையொட்டி சென்னையில் சர்வதேச மலிவு விலையில் குடியிருப்புகள் அமைப்பது குறித்து (International seminar on Low cast Housing) கருத்தரங்கம் நமது சங்கமும் மத்தியநகர்ப்புற மேம்பாட்டு அமைச்சகமும் இணைந்து நடத்த ஏற்பாடு செய்யப்பட்டது.

இந்தக் கருத்தரங்கம் சென்னை நுங்கம்பாக்கம் தாஜ் கோரமாண்டல் ஓட்டலில் மிகச் சிறப்பாக நடைபெற்றது. இதில் இந்திய அளவில் மிகச் சிறந்த பொறியாளர்கள், மத்திய மாநில அமைச்சர்கள், சர்வதேச கட்டுமான வல்லுநர்கள் பங்கேற்று தங்களுடைய கருத்துக்களை பதிவு செய்ததின் மூலம் பயனுள்ள கருத்தரங்கமாக அமைந்தது. இது நமது அகில இந்திய சங்கத்தின் முக்கிய மைல்கல் என்பது குறிப்பிடத்தக்கது.

இந்தக்கால கட்டத்தில் நடைபெற்ற அகில இந்திய மாநாடுகள்

முதல் அகில இந்திய மாநாடு மும்பாய் பட்டினத்தில் 1952ம் ஆண்டு நடைபெற்றது. அதில் முதன்மை விருந்தினராக அன்றைய மத்திய பொதுப்பணித்துறை அமைச்சர் திரு. N.V. காட்கில் அவர்கள் கலந்து கொண்டார். Dr. G.S. Dugal அவர்கள் நமது சங்கத்தின் தலைவராக இருந்து மாநாடு செவ்வனே நடைபெற்றது. இந்த மாநாடு அதற்கு பின் நடைபெற்ற மாநாடுகளுக்கெல்லாம் அடித்தளம் அமைத்த மாநாடாக அமைந்தது. மற்றைய மாநாடுகள் பற்றிய நினைவலைகள் அடுத்த இதழில் தொடரும்.

உங்கள்

இராதாகிருட்டிணன்

Fast Track Construction Practice and its Applications

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Fast-track construction is adopted to reduce the project time by overlapping many activities and processes such as project design, construction phases, project management, etc in a project delivery system. Fast-track construction can reduce the construction cost, overhead cost and reduce the impact of inflation during construction. Proper time management and use of appropriate equipment contributes to economy, quality, safety, speed and timely completion of a project. But Fast-Track is more difficult to manage than the traditional Design-Bid-Build process. It requires detailed knowledge of the process, effective planning, integrity and close coordination among the organizations executing the work.

Fast-track approach to the achievement of early project delivery by involving the application of innovative construction materials and technology, use of modern equipments, latest construction management techniques, in-house design and build, procurement plan, and advanced process. The phases of the Fast-track construction are: Integration of construction and design phases; Involvement of the contractor in both the design and construction phases; Overlapping of work packages to enable construction of sections of the project to proceed while the design for other sections is being progressed and employment of expertise of suppliers in design and construction. Using proper equipment is also very important for a construction projects. The inception of equipment in view of managing works of residential commercial and public projects like roads, dams, etc. have revolutionized productivity needs. Construction equipment has brought great changes in carrying out reliable and faster structural works.

Time, with its associated costs are vitally important for each participant in the construction process including the lender, owner, architects, engineers, contractor, as well as those who provide bonding and insurance coverage. Effective management and the administration of the contract time and change provisions are central to the avoidance and mitigation of extended time and cost overruns. To enhance the chances of a successful project outcome, it is essential for participants in the construction process to have a basic understanding of critical path scheduling specifications, and the software involved. So, completing the construction within its given deadline is the most important aspect.

Why Fast Track Construction?.

Fast track construction is not only for high volume projects but also for complex projects so as to reduce the time and cost. The complex projects are : (a) Building in close proximity to very steep or very unstable slopes (b) Building a tall building with deep basement, (c) Construction carried out in extremely congested urban environment. (e) Constructions in close proximity of very sensitive and congested underground facilities such as Mass Transit Railway subways, surcharged areas of building foundations, layers of large-sized drains, gas and water pipes and culverts etc. (f) Constructions in newly reclaimed or previous dump-filled areas. Risks involved in these constructions are relatively high and need careful planning, innovative construction methods and appropriate equipments to complete the project in a planned time frame.

Importance of Project Management in Fast Track Construction

Control is redefined from “monitoring results” to “making things happen”. Performance is maximizing value and minimizing waste at the project level. Value to the client is defined, created and delivered throughout the life of the project. Key organizational features include leadership, teamwork and trust are very important aspects in fast track construction. The construction requirement is the basis for planning the supply

of design, documentation, materials, equipment and resources. Providing the wrong goods or service the right way is waste "do the right project before you do the project right" . Project control is "controlling the project", not just retrospective monitoring. Good communication are needed to support decision making. Eliminate ineffective time on site activities. Give significant attention to project with new innovative technology and construction methodology.

Project Management for Fast Track Construction

To achieve fast track construction, sound management procedures are necessary. It is essential that the project team have a clear understanding of what has been agreed by stakeholders to be in the scope and what is outside the scope. Ultimate objective of the construction is the accomplishment of project completion by adopting suitable material, methods and machines. The constructor must select the proper equipment to process materials and build the structure economically. Whereas most manufacturing companies have a permanent factory and the construction company carries its factory with it from site to site depending on job requirement. The following factors are to be considered during Project Management For Fast Track Construction:-

Planning. It is essential that, as the definition evolves, work is scheduled on the basis of achieving the earliest beneficial use of the finished asset. It is also essential that interactive planning process advocated as a team building activity

Technical considerations. Many technical considerations in fast track construction. They are: (a) Fastest method to manufacture and construct rather than cheaper, (b) Reuse of design from existing assets, (c) Modular design, (d) Pre-fabrication of components, (e) Minimization of project scope by lean construction approach, (f) Reduction of processing steps in a manufacturing plant, (g) Elimination of non-essential elements of the design, (h) Standardization of layout or repeated units, (i) Standardization of components, (j) Simplification of design procedures and dependencies.

Project Process. Based on the project organization, the project procedures may be those of the client, the contractor or one of the other parties. Standard processes need to be modified to accommodate the degree of overlap between various stages. Authority to approve modifications should be assigned ASAP.A project risk management system must be set up as part of the project procedures. A good system for project documentation is essential.

Project control. Care is needed to ensure that previously rejected ideas are not reintroduced at the definition stage. The use of value Engineering / constructability is essential to enhance the decision making process

Project Communications. A good communications system need to be established and maintained. This could include: intranet, Extranet, Internet, Chat rooms, Bulletin Boards, Event Calendars, Data Base, etc. The greater the level of integration in the sharing and reuse of information the more that the communication system will support the project and enhance success.

Cost. Approval of cost will have to be given on a lower level of definition and with a wider tolerance on the estimate if the project is to proceed unhindered by the supply of funds. A cost estimate to within plus or minus 10% will not be obtained until the end of the design stage. It is recommended that a control estimate should be produced once all the necessary details are known. During this stage it will be necessary to address the potential cause of increased cost which may rise.

Risk. Consider all risks associated with the increased level of overlap between definition and design stages of a project. Risk analysis is performed for risk elimination and risk avoidance. Otherwise necessary extra care and method has to be anticipated to counter the risk.

Advanced Materials for Faster Construction

New innovative materials will help in completing the construction faster. Building Materials & Technology Promotion Council (BMTPC), Central Building Research Institute (CBRI) and other Research Institutes engaged in R&D for developing new materials and technologies for faster and economical construction. Large number of innovative and advanced materials are available in the market. It is very important to select the appropriate materials for a specific construction work. Some of the materials used for faster construction are highlighted below:

(a) High Performance concrete (HPC). HPC is produced with minimum w/c ratio of 0.35, Minimum durability factor of 80%, Very early Strength of 20 MPa at 4 hrs , High early strength of 35 MPa at 24 hrs and Characteristic strength of 60 MPa at 28 days.

(b) High Strength Concrete (HSC) . High strengths up to 80MPa in India and up to 115 MPa (Euro codes)

concretes are available in market for faster construction. The other advantages of high strengths concrete are Faster erection, Lighter girders; smaller bearings, reduction in foundation cost, better durability, high early strength and saves up to two days in time cycle. Also, less pre-stressing & reinforcement due to reduced cross section, pouring concrete easier and stressing loss due to friction decreases by 8% are other advantages of HSC..

(c) Self Compacting Concrete (SCC). SCC flows under its own weight around closely spaced bars. It forms compact void-free mass without vibration. Components of SCC are 50% of coarse aggregate, 40 % fine aggregate by volume, water powder ratio of 0.9-1.0 and super plasticizers as required. SCC reduces construction time, less manpower for placing and compacting, Lower vibrating equipment cost and copes with dense reinforcement & complex shapes.

(d) Micro silica. It is the by-product of ferrosilicon having particle size of 0.5 microns. 5-8 % of ultrafine micro silica spheres added to the cement mix to fill the gaps between cement grains and to form a very dense concrete, It reacts with calcium hydroxide during hydration and increases the compressive strength. It is available in 25 Kg bags in the market. It is used for preparation of HPC, grout additive, impermeability and durable concrete, nuclear containments agent and eliminates coating requirements.

(e) Nanoconcrete. Nano materials are those physical substances which have at least one dimension between 1 to 150 nm (1 nm = 10–9 m). The nano materials properties are different from the properties of the same materials at micro (10–6 m) or macro scales (10–6 to 10–3 m). Nano concrete use nano silica and clinker which increase densification , mechanical properties and durability of cementitious materials. Service life can be doubled through the use of nano-additive viscosity enhancers which reduce diffusion effect of harmful agents in concrete. Photo catalytic TiO2 added to concrete for reducing carbon monoxide and NOx emissions.

Advanced Technology and methods for Faster Construction

Various new innovative construction methods are available for faster construction. There are many sophisticated technology and advanced construction methods are available for fast track construction. It is very important to select the appropriate technology for a specific construction work. Some of the technology used for faster construction are highlighted below for understanding:

(a) Precast Technology. Precast technology meets the challenges and speed of construction. Conventional method of construction, ie in situ construction are taking more time and quality control is a big issue. Precast elements are finite size, manufactured at the yard, transported to the site and assembled as a complete structure. Mass production is possible at casting yard with controlled quality. Many of the infrastructure development sector such as bridges, Metro rail, tunnel, sewage line, railways sleepers, poles etc. are largely adopting precast segments.

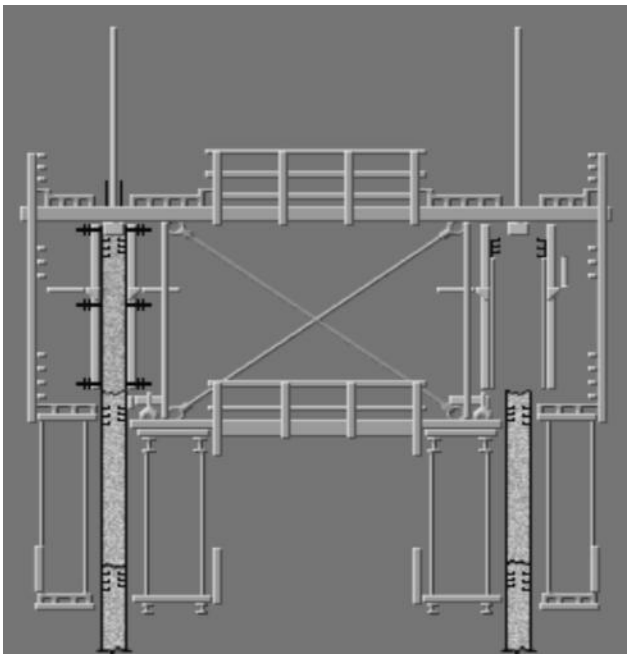
(b) Mivan Form Work for wall construction in a multi-storeyed building

Mivan is basically an aluminium formwork system used widely in the construction of residential units and mass housing projects for constructing large number of houses within short time using room size forms to construct walls and slabs in one continuous pour of concrete. Early removal of forms can be achieved by hot air curing / curing compounds. This facilitates fast construction, say two flats per day. All the activities are planned in assembly line manner and hence results into more accurate, well – controlled and high quality production at optimum cost in shortest possible time. They afford large number of repetitions (around 250). The frames for windows and door as well as ducts for services are placed in the form before concreting.

(c) Jump form for shifting form work. Construction of steel frame forms over central core and hung from panels. After casting the walls, formwork is released and the frames climbs up. Form panels are closed

Microsilica

Mivan Form Work

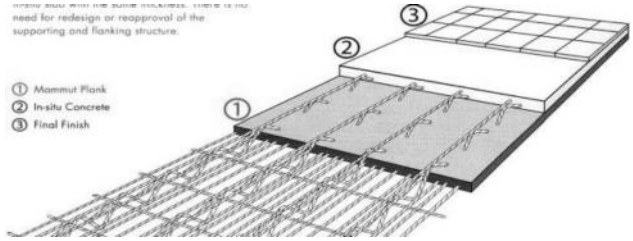


Jump form

at next level and concrete is poured to cast the members. Using jump form, four day cycle time can been achieved easily.

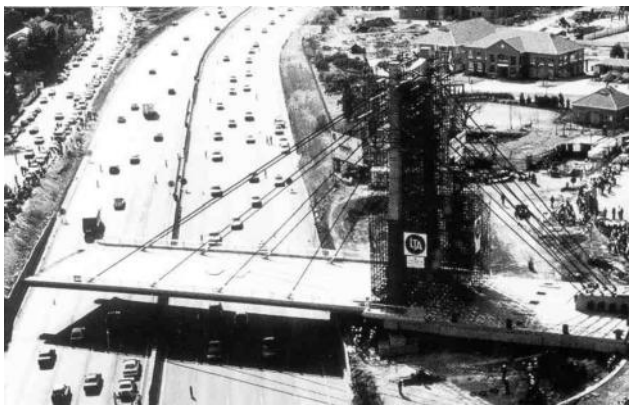
(d) Pre-cast Planks Formwork. After erection of precast planks, slab top reinforcement is placed and concreted in-situ. Planks and the in-situ concrete jointly acts as monolithic slab It has been successfully used worldwide for, apartments, villas, office buildings, industrial complexes etc. Twin office towers of 102 m height with 28 floors + 4 basements and an area of 150000 m^2 was built in just 10 months. By Using high early strength of 15 MPa in 24 hrs concrete formworks are dismantled after 24 hours and erected for the next floor. The stationary booms climb up to the next floor after 4 hours.

(e) 30-Story Steel Building in 15 Days in China. A steel building of 328 feet high tower was constructed In just 360 hours, called the T30 rises on an empty site to overlook Hunan's Xiang River in China. All the el-



Pre-cast Plank Formwork

30-Story Steel Building



Fly over in South Africa

ements were fabricated prior to start of construction and assembled at site as fast as possible.

(f) Fly over in South Africa. A cable stayed bridge was constructed in south Africa on bearings at right angle to final location. Once the construction was completed, the bridge was rotated 90 degree and placed its position without stopping the traffic.

Equipments Used in Construction are Earth-moving equipment, Hauling equipment, Hoisting equipment, Conveying equipment, Aggregate and concrete production equipment, Pile-driving equipment, Tunnelling and rock drilling equipment, Pumping and dewatering

equipment. These equipments are essential components in fast track construction. Automation and mechanisation of the construction activity is the key factor in fast track construction.

Building Management System (BMS) for Fast Track Construction

Integrated Building Management System (IBMS) is a complete information delivery system that monitors and controls a variety of systems and functions at an optimal level of efficiency. The BMS system consists of : Building Automation System, Fire Detection and Alarm System, Public Address System, Security System, Power System, Illumination System, Electric Power control system. Heating, Ventilation and Air-conditioning (HVAC) System , Plumbing System, Security & Observation System, Magnetic card and access system, Fire Alarm system, Burglar Alarms and Lifts/ Elevators.

A BMS is most common in a large building. Its core function is to manage the environment within the building and may control temperature, carbon dioxide levels and humidity within a building. It controls heating and cooling, manages the systems that distribute this air throughout the building, and then locally controls the mixture of heating and cooling to achieve the desired room temperature. BMS systems are linked to access control and other security systems such as closed-circuit television (CCTV) and motion detectors. Fire alarm systems and elevators are also linked to a BMS. If a fire is detected, the system shuts off dampers in the ventilation system and stops smoke spreading & sends all elevators to the ground floor.

Few Examples of Faster Construction adopted in Tall Building Constructions

Tall building construction needs many innovative methods to speed up the construction. The floor cycle time needs to be reduced as short as possible. Cost of construction can be reduced by achieving best cycle of 7 days/ floor in India and 2 floors per week in other countries. The best record is of 2 days / floor at IFC, Hong Kong. Construction of filler walls have to be completed simultaneously. All other services, finishes and interior works have to be executed along with raising of the structure. Some of the fast track projects completed are highlighted for understanding the methods adopted in construction.

(a) Burj Khalifa – World's Tallest Building completed in 2009. The high strength concrete grade C 80 was used in raft foundation and walls upto 452 m height and walls up to 570 m used C60 grade with a w/c ratio of 0.3. 150 mm ID pipelines were fitted over entire delivery height for pumping high strength concrete and were designed for max concrete pressure of 250 bars. Four days cycle / floor were followed and slab forms were removed 24 hrs after concreting. Every day slab areas of different sizes were poured in each wing and the core so that one level was completed every 4th day. Slabs were poured at 6 pm and formworks were stripped at noon the following day. Meva Dec drop head with quick lowering system allowed early stripping while the props remained as re-shoring. Panels were moved to the next floor by using lifting gears. Advantages of composite plastic facing of formwork are that the facing will never have to replaced regardless of number of reuses during constrction.

(b) Petronas Towers, Kuala Lumpur, 450m Height. Tallest building (when built), with 88 floors + 6 basements had a project duration of 28 months and cycle time of 4.3 days per floor. Petronas Towers used concrete grade of C60 and C80 MPa and raft concrete temperature was maintained below 20oC. Top and sides of the foundations were insulated by polystyrene formwork which were struck for 15 hrs to minimize cracking in core-walls to satisfy the curing requirements. Concrete was prepared with w/c ratio of 0.25 and OPC / PFA & silica fume combination to reduced the risk of early age thermal cracking. The project used 11 Luffing cranes with capacities to accommodate lifting heights of 500 meters, continuous operation for 24 hours a day and 7 days a week. The line speeds had to accommodate cycle times to allow construction period of 24 months. Due to intense lifting schedules and 24-hour operation, six crane operators were allocated to each crane at the peak of construction period. Service support engineers were on 24-hour call on standby at the site.

(c) Taipei Financial Centre Building, 508mht. Column size of 3 m x 2.4 m and 8 cm thick were designed out of steel. Design loads of 38000 t. Heavy steel reinforcement, 85 MPa concrete surrounding structural steel columns Grade 60 TMT reinforcement for lower carbon and higher weldability were the important construction techniques that were used in the building.

(d) Trump Tower Hotel, Chicago used SCC for the foundation raft and columns in certain regions and high strength SCC up to 138 MPa. 3800 m3 SCC were pumped in 24 hours for the raft. 30 different concrete mixes was used and each mix contains


Burj Khalifa


Petronas Towers, Kuala Lumpur


Taipei Building


Trump Tower Hotel

different percentage of super plasticizers, different amounts of cement, fly-ash, slag and silica fume. The material consisted of approx 3,800 cubic meters of 88 MPa SCC over plan area of 60 x 18 m in a single continuous pour. The pour was accomplished in a period of 22 hours and required more than 30 ready-mix trucks making a total of 600 trips to the job site.

Conclusion

Fast-track construction process can be used where time constraint is the main aspect. As construction projects need to complete in a given deadline, the use of appropriate materials, construction method and equipment to overcome the complications faced on site during construction. High early strength concrete, innovative form work and prefabricated elements help in timely completion of the project. Prefabrication offers significant advantages in terms of construction time, safety, environmental impact, constructability, and cost. Many successful large scale projects have shown the advantage of fast track construction. Therefore, fast track method is a very good option to achieve all difficult and high volume constructions.

Regulation for Group Developments

S. Ramaprabhu, Joint Secretary

(1) Group Development – means accommodation for residential or commercial or combination of such activates housed in two or more block of buildings in a particular site irrespective of whether these structures are interconnected or not. Any inter link between the structures into one block. However, if these blocks are connected solidly at least for one –third the width of any one block on the connecting side, then such blocks shall be constructed as a single block.

(2) (a). The Minimum Width of the public road on-which the site abuts or gains access shall be 10m

The minimum Width Stated above shall be the Existing width of the road and not the street alignment prescribed.

Explanation

(i) Road width means the road space as defined in DR no.2(35). The Qualifying road width for permitting Group development shall be available atleast for a stretch of 250m along the length of the road abutting the site and the stretch from a junction can be straight or a curve or zigzag or combination of the above.

To cite examples

a) If the road over its general length is of 10 meters width, but because of some kinks in front of the site one end is 9.8 metres and the other end is 10.2 metres is acceptable.

b) If the general road is of width less than 10 meters width, but only widens opposite to or nearer to the site is more than 10 meters, is not acceptable.

c) If the road is generally of 10 meters width up to a considerable length on one side, but discontinues and narrows into a road of smaller width on the other side of the site in question and the plot owner is willing to leave enough space for continuity of 10 meters road in front of hid site, this will have to be checked and decided on case – by –case.

d) If the General road width is less than 10 meters and the site owner merely agrees to leave enough space to have 10 meters in front of his site only, this is not acceptable.

(ii) Road width measurements for the above purpose shall be of the road as designed and laid and the existence of unauthorized encroachments, for which no patta has been given, will not normally affect adversely provided the storage in width in the min. stretch stated above does not exceed 10% of the min. prescribed width. However permissibility or otherwise (in Exceptional cases) in such specific situations will be decided case –by-case.

(b) If the site does not directly abut a public road but gains access through a private exclusive passage or through a part of the plot which can be treated as a passage from a public road of minimum width as prescribed above, the minimum width as prescribed above, the minimum width of such passage shall be as follows.

Sl. No	Description	Minimum width.
1	when it is intended to serve six dwelling or upto 600 square metres of commercial building and the length of the passage does not exceed 801 metres.	3.6 metres.
2	When it is intended to serve up to 8 dwellings or upto 2,400 square metres of commercial building and the length of passage does not exceed 120 metres.	4.8 metres.
3	When it is intended to serve not more than 10 dwellings or upto 3000 square metres of commercial building and the length of passage does not exceed 120 metres.	7.2 metres
4	When it is intended to serve not more than 20 dwellings or upto 6000 square metres of commercial building and the length of passage does not exceed 240 metres.	9.0 metres
5	When it is intended to serve more than 20 dwellings or more than 6000 square metres of commercial building.	10.0 metres

Courtesy: CMDA…..

To be continued…..

Open Air Theater

Er. S.Ramanathan

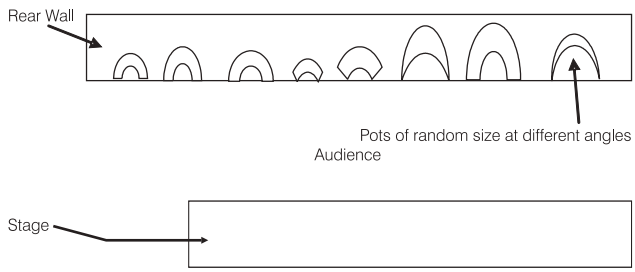
Open air theaters were first constructed in South India, especially in the southern parts of the present Tamilnadu. It is the evolution of the ' Theru Koothu ' stage.Before knowing more about this let us answer the following question:

Why ladies are preferred to the posts of telephone operators and receptionists?

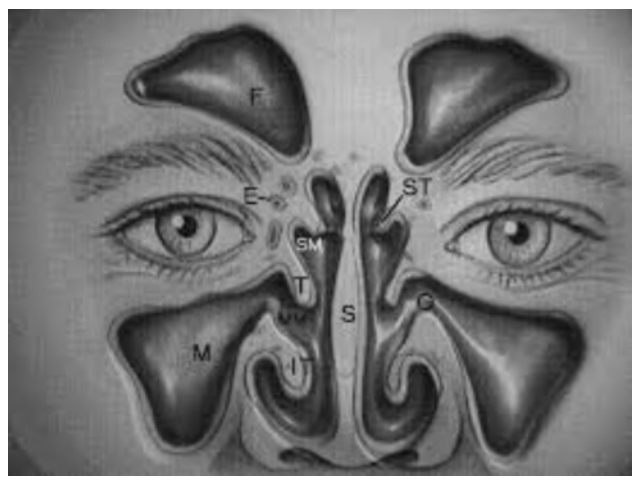
Charm, emphatic no : it is trivial. It is an Acoustic factor gifted by nature to ladies, and the explanation is:

- An adult female has shorter vocal cord about 2/3rd the length in an adult male. Shorter vocal cords vibrate with a high frequency compared to longer ones.[mathematically frequency is inversely proportional to the square root of length or simply $f \propto 1 / \sqrt{L}$. Pitch is related to frequency. High frequency means short sound waves or high tones. Hence woman's short vocal cords produce high pitched tones.[Probably to control her man].
- Any word in any language contains more number of consonants than vowels. Correct recognition of consonant sounds is the principal factor in speech intelligibility. Vowel sounds are produced by flow of air from lungs to the vocal cords , whereas consonants by obstructing air flow from lungs. The tongue, lips, palate and teeth play a major role in producing the consonants. The above organs along with the sinus cavities [resonators] are so formed in women to pronounce the consonants legibly with their inborn high pitched tones. This accounts for speech intelligibility and hence ladies are mostly employed as telephone operators and receptionists and also as announcers.
- This is another one of the millions of feminine mysteries!
- Now let us go back to the open air theater (OAT). The ideal theater is the Open air theater., no reverberation and no echo. This was the invention of the South Indians in an unknown time in B.C. They studied the tonal characteristics of ladies , built a high earthen wall parallel to and opposite to the stage on the rear of the audience and fixed on the wall mud pots of varying sizes at different angles facing the stage . They served as resonators similar to the sinus cavities. This design was adopted in North India later. Remnants of OAT can be seen near Gandhi Museum, Madurai

When Alexander the Great invaded India , Aristotle sent experts in varying fields to study and collect materials on Logic, Mathematics , Architecture etc. They copied the design of the open air theater and built the first open air theater in Athens. Later the first Olympics were conducted there.



Typical Open Air Theater



Sinus cavities

SOUTHERN CENTRE ACTIVITIES

03.06.2015: கலந்தாலோசனைக்கூட்டம்

Pidilite Industries நிறுவனத்தைச் சேர்ந்த செல்வி அர்பிதா ராய் லுத்ரா - Head Business Development - Construction Materials அவர்கள் நேராக நமது மய்ய அலுவலகத்திற்கு வருகைபுரிந்தார். அவருடன் திரு. E. ராஜராஜன் - CC Retail அவர்களும் வந்திருந்தார்கள். மய்யத்தலைவர் திரு. O.K. செல்வராஜ், கவுரவ செயலாளர் திரு. K. வெங்கடேசன், கவுரவ பொருளாளர் திரு. K. அண்ணாமலை மற்றும் முன்னாள் மாநிலத்தலைவர் திரு. Mu. மோகன் ஆகியோருடன் பேசும்போது அவர்கள் தென்னக மய்யத்துடன் இணைந்து தொழிலாளர் பயிற்சி முகாம் நடத்துவதற்கு தயாராக உள்ளதாகவும் தெரிவித்தனர். அது தவிர அவர்களது அரங்கை தென்னக மய்யம் நடத்தும் மற்ற தொழிலாளர்கள் பயிற்சி முகாம்களுக்கும் இலவசமாக நடத்த அனுமதி அளிப்பதாகவும் தெரிவித்தனர். மேலும் நாம் நடத்தும் கூட்டங்களுக்கு Hightea யும் complimentary யாகவும் கொடுப்பதாகவும் கூறினர். இவை நமக்கு கிடைத்த இரட்டை இனிப்பு செய்தியாகும்.

கலந்தாலோசனைக்கூட்டம்

The National Small Industry Corporation Ltd (Govt. of India Enterprises) திரு. M. ஸ்ரீவத்சன் - முதன்மை மேலாளர் மற்றும் மேலாளர் நமது அலுவலகத்திற்கு வருகை புரிந்து மய்யத்தலைவர் திரு. O.K. செல்வராஜ், துணைத்தலைவர் திரு. C. சதீஷ் குமார், கவுரவ செயலாளர் திரு. K. வெங்கடேசன், கவுரவ பொருளாளர் திரு. K. அண்ணாமலை, இணைச் செயலாளர் திரு. S. இராமப்பிரபு. உடனடி முன்ன ாள் மய்யத்தலைவர் திரு. R. சிவக்குமர், ஆகியோருடன் கலந்தாலோசித்தனர். அப்போது கட்டுமானப் பொருட்கள் வாங்குவதற்கு Bank Guarantee அளித்தால் ரு.5.00 கோடி வரை 90 நாட்கள் கடன் வசதி செய்து தரப்படும் என்றும் மேலும் இதை மற்ற உறுப்பினர்களுக்கும் தெரிவிப்பதற்காக கருத்தரங்கு ஒன்றை ஏற்பாடு செய்ய தயாராக இருப்பதாகவும் தெரிவித்தனர்.

09.06.2015: தொழிலக பாதுகாப்புமற்றும் சுகாதார பயிற்சி முகாம்

தமிழக அரசின் Industrial Safety & Health Directorate, இராயப்பேட்டை சென்னை சார்பாக காலை 10மணி அளவில் தொழிலக பாதுகாப்பு மற்றும் சுகாதாரம் பற்றிய பயிற்சி முகாம் தென்னக மய்யத்தின் ஆதரவுடன் தென்னக மய்ய உறுப்பினர்களுக்காக ஏற்பாடு செய்யப்பட்டது. மய்யத்தலைவர் திரு. O.K. செல்வராஜ் அவர்கள் Industrial Safety & Healthy Dirctorate-ன் இயக்குநர் திரு. C. ஞானசேகர பாபுராவ், முதுநிலை கூடுதல் இயக்குநர் (BOCW) திரு. P. போஸ், இணை இயக்குநர் (BOCW) திரு. A.R. பாஸ்கரன், துணை இயக்குநர் திருமதி காயத்திரி, துணை இயக்குநர் திரு. கமலக்கண்ணன் (காஞ்சிபுரம்) அகில இந்திய முன்னாள் தலைவர் திரு. R. இராதாகிருட்டிணன், அலுவலக நிர்வாகிகள், முன்னாள் காப்பாளர் டாக்டர். D. துக்காராம், உடனடி முன்னாள் அகில இந்திய துணைத்தலைவர் திரு. L. மூர்த்தி மற்றும்செயற்குழு / பொதுக்குழு, மேலாண்மைக்குழு மற்றும் இதர உறுப்பினர்கள் அனைரைவயும் வரவேற்று பயிற்சியில் கலந்து கொண்டவர்கள் இந்த நல்ல வாய்ப்பினை பயன்படுத்திக்கொள்ளுமாறு கேட்டுக்கொண்டார். அகில இந்திய முன்னாள் தலைவர் திரு. R. இராதாகிருட்டிணன் தனது உரையில் நல்ல உபயோகமான பயிற்சி ஏற்படுத்திக் கொடுத்த தொழிலக பாதுகாப்பு மற்றும் சுகாதார இயக்ககத்தற்கு நன்றி கூறியதுடன், தற்போது கட்டுமானத்துறையில் தொழிலாளர் பாதுகாப்பு மிகவும் நல்லமுறையில் அமுல்படுத்தப்பட்டு

வருகிறது என்றும் அதனால் விபத்துக்கள் தவிர்க்கப்படுகிறது என்றும் கூறினார். மேலும் தொழிலாளர் பாதுகாப்பு அமுல்படுத்தப்பட்டு வரும் அளவுக்கு தொழிலாளர் சுகாதாரம் முழு அளவில் செயல்படுத்தப்படவில்லை என்பதையும் சுட்டிக்காட்டினார். திரு.ஞானசேகர பாபுராவ் - இயக்குநர் பயிற்சி முகாமை துவக்கி வைத்து தொழிலாளர் பாதுகாப்பில் இயக்ககம் ஆற்றி வரும் பணியை விவரித்தார். இணை இயக்குநர் (BOCW) திரு. A.R. பாஸ்கரன் அவர்கள் தொழிலாளர் பாதுகாப்பு பற்றிய பயிற்சி முகாமை Power Point மூலமாக மிகவும் சிறப்பாக நடத்தினார். துணை இயக்குநர் திருமதி. காயத்திரி அவர்கள் Scaffolding - பயன்பாட்டையும், தவறான Scaffolding உபயோகப்படுத்துவதன் மூலம் ஏற்படும் விபத்துக்களையும் முக்கியமாக Personl Fall Arrest System (PFAS) பற்றியும் Power Point மூலமாக விவரித்தார். துணை இயக்குநர் (காஞ்சிபுரம்) திரு கமலக்கண்ணன் அவர்கள் Planning and Checking முக்கியமாக கட்டுமானத்துறை தொழிலில் பின்பற்ற வேண்டும் என்றும் மற்றும் பொதுவாக கட்டாயமாக கடைபிடிக்க வேண்டிய பாதுகாப்பு முறைகளை ஓரிரு குட்டிக்கதைகளை கூறி விளக்கம் அளித்தார். முதுநிலை கூடுதல் இயக்குநர் (BOCW) திரு. P. போஸ் அவர்கள் Case Studies - ஏற்கனவே பல்வேறு பணியிடங்களில் ஏற்பட்ட விபத்துக்களை பற்றி எடுத்துக்கூறி அது எவ்வாறு தவிர்க்கப்பட வேண்டும் என்பதையும் தெரிவித்தார். பயிற்சியின் முடிவில் அகில இந்திய முன்னாள் தலைவர் திரு. R. இராதாகிருட்டிணன் அவர்கள் திரு. P. போஸ் அவர்களுக்கு பின்வரும் ஆலோசனைகளைக்கூறி அதை கட்டுமான பணியிடங்களில் கட்டாயமாக அமுலாக்க வேண்டும் என்று கேட்டுக் கொண்டார்.

ஆலோசனைகள்

1. கைப்பேசிகளை பணியிடத்திற்கு செல்வதற்கு முன் பாதுகாவளாளி (Security)யிடம் ஒப்படைத்தல்.
2. Dress Code - அதாவது எல்லோரும் உரிய ஆடைகளை அணிதல்.
3. பணியிடத்தில் பணி தொடங்குவதற்கு முன்பாக தொழிலாளர்களிடம் பொறியாளர்கள் மற்றும் மேற்பார்வையாளர்கள் 15 நிமிடங்கள் செலவழித்து பாதுகாப்பு பற்றிய விழிப்புணர்ச்சியை ஏற்படுத்துதல்.
4. Industrial Safety & Health Directorate - பாதுகாப்பு விதிகளை மீறுபவர்கள் மீது பாரபட்சமில்லாமல் நடவடிக்கை எடுத்தல்.

கவுரவ செயலாளர் திரு. K, வெங்கடேன் Industrial Safety & Health Dirctorate யைச் சேர்ந்த இயக்குநர், முதுநிலை கூடுதல் இயக்குநர், துணை இயக்குநர்கள் ஆகியோருக்கு ஒரு சிறந்த பயிற்சி முகாமை நடத்திக் கொடுத்ததற்காக நன்றி கூறினார். மேலும் தென்னக மய்யம் சார்பாக கலந்து கொண்ட மூத்த தலைவர்கள், அலுவலக நிர்வாகிகள், செயற்குழு / பொதுக்குழு உறுப்பினர்கள், இதர உறுப்பினர்கள் பயிற்சி முகாம் நடத்த அரங்கம் அளித்து உதவிய Indian Officers Association (IOA) நிர்வாத்தினருக்கும் நன்றி கூறினார். பயிற்சியில் கலந்து கொண்ட அனைவருக்கும் இயக்ககம் சார்பாக சிற்றுண்டி, தேநீர் மற்றும் மதிய உணவு வழங்கப்பட்டது.

16.06.2015: Preliminary Meeting on Schedule of rates

Er. S. Thirumaran, Engineer-in-Chief, WRD & Chief Engineer (General), PWD அவர்கள் சார்பாக Schedule of Rates 2015-16 பற்றிய Preliminary Meeting PWD வளாகம், சேப்பாக்கம், சென்னையில் மாலை 4 மணி அளவில் ஏற்பாடு செய்திருந்தார். அக்கூட்டத்தில் தென்னக மய்யம் சார்பாக கவுரவ செயலாளர் திரு. K. வெங்கடேசன், PWD துணைக்குழுத்தலைவர் திரு. T.V. ராமகிருஷ்ணன், உடனடி முன்னாய் துணைத்தலைவர் திரு. L. மூர்த்தி, மாநிலத்தலைவர் திரு. N. ரகுநாதன், மாநிலச் செயலாளர் திரு. S.E. மோகன்பாபு, ஆகியோர் கலந்து கொண்டு தங்கள் கருத்துக்களை பதிவு செய்தனர். மேலும் பொதுப்பணித்துறை மற்றும் நெடுஞ் சாலைத் துறையைச் சார்ந்த அதிகாரிகள் 20 பேர் கலந்து கொண்டு தங்கள் கருத்துக்களைப் பகிர்ந்து கொண்டனர்.

19.06.2015: சேவை வரி

கவுரவ செயலாளர் திரு. K, வெங்கடேசன் அவர்கள் ரயில்வேஸ் கணக்கு அதிகாரிகளை சந்தித்து சேவை வரி பற்றி கலந்தாலோசித்தனர்.

30.06.2015: பயிற்சி முகாம்

Advance Water proofing tEchnology for Terrace & Bathroom - பற்றிய பயிற்சி முகாம் Pidilite Industries நிறுவனத்துடன் இணைந்து நமது

சொசைட்டி அலுவலத்தில் மாலை 4.30 மணி முதல் 7 .00 மணி வரை தென்னக மய்யம் சார்பாக ஏற்பாடு செய்யப்பட்டது. மய்யத்தலைவர் திரு. O.K. செல்வராஜ் அவர்க் கேட்டுக்கொண்டதன் பேரில் அகில இந்திய முன்னாள் தலைவர் திரு. M கார்த்திகேயன பயிற்சியில் கலந்து கொள்ள வந்திருக்கும் அனைவரையும் வரவேற்று இந்த பயிற்சியின் பலனைப் பெறுமாறு கேட்டுக்கொண்டார். அதைத்தொடர்ந்து பயிற்சிக் குழுத்தலைவர் திரு. S.E. மோகன்பாபு, திரு. E. ராஜராஜன் - Regional Manager - pidilite Industries அவர்களை அறிமுகப்படத்தி பயிற்சி வகுப்பை நடத்துமாறு கேட்டுக்கொண்டார். திரு.ராஜராஜன் மற்றும் அதிகாரிகள் Power Point உதவியுடன் மேற்கண்ட பொருளை பற்றி மிகவும் சிறப்பாக விளக்கம் அளித்தனர். இந்த பயிற்சி முகாமில் பல்வேறு நிறுவனங்கள் சார்பாக 70க்கும் மேற்பட்டோர் கலந்து கொண்டு பயனடைந்தனர். pidilite Industries நிறுவன அதிகாரிகளுக்கு தென்னக மய்யம் சார்பாக நினைவுப் பரிசு வழங்கப்பட்டு கவுரவிக்கப்பட்டனர். பயிற்சியில் முடிவில் பயிற்சி முகாம் தலைவர் திரு. S.E. மோகன்பாபு, அனவைருக்கும் நன்றி கூறினார். இந்த பயிற்சியில் கலந்து கொண்ட அனைவருக்கும் இரவு உணவு மற்றும் பரிசுப்பொருள் Pidilite Industry நிறுவனம் சார்பாக வாங்கப்பட்டது.

SUDOKU

May Issue - SUDOKU - புதிருக்கான விடை

4	9	**3**	**5**	7	1	6	2	**8**
2	**5**	7	**3**	**6**	8	**9**	4	1
8	1	6	9	**2**	4	**3**	**7**	5
6	3	**8**	**4**	1	9	2	5	**7**
9	4	2	7	5	3	**8**	**1**	**6**
1	7	**5**	**2**	8	**6**	4	9	3
5	2	9	6	3	**7**	1	**8**	**4**
3	8	4	1	**9**	5	**7**	6	2
7	6	**1**	8	4	**2**	5	**3**	9

June Issue - SUDOKU - புதிர்

4		**1**		**3**		**9**		
2			**6**			**3**		
				9	**4**		**1**	
	2			**4**	**8**			
		6	**9**				**3**	
	4					**2**		**9**
	5	**7**	**1**					
6							**9**	**5**
			8	**2**	**5**		**6**	

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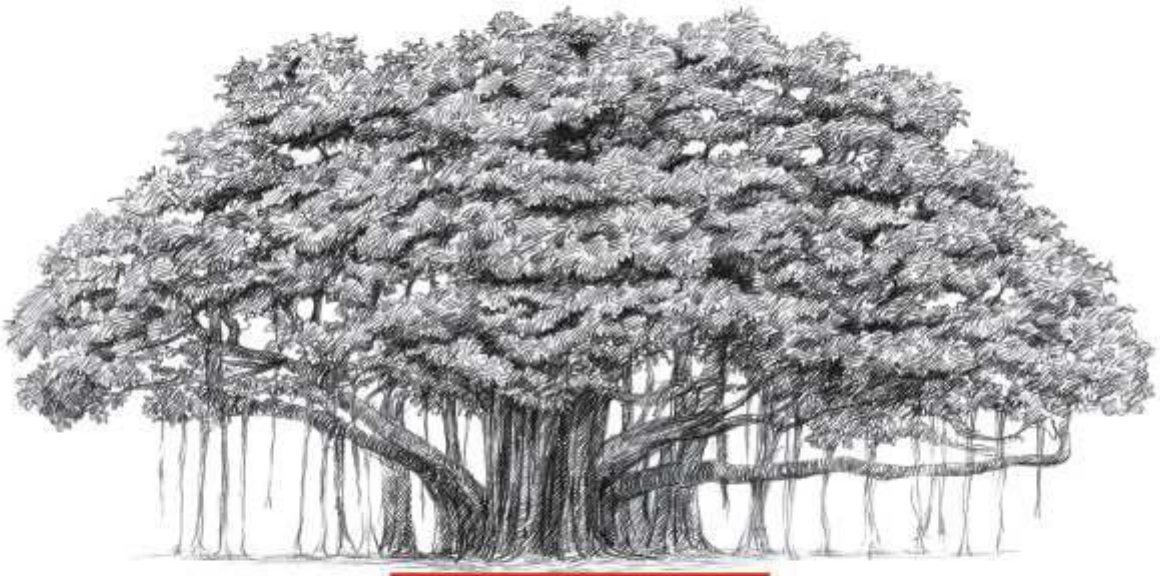

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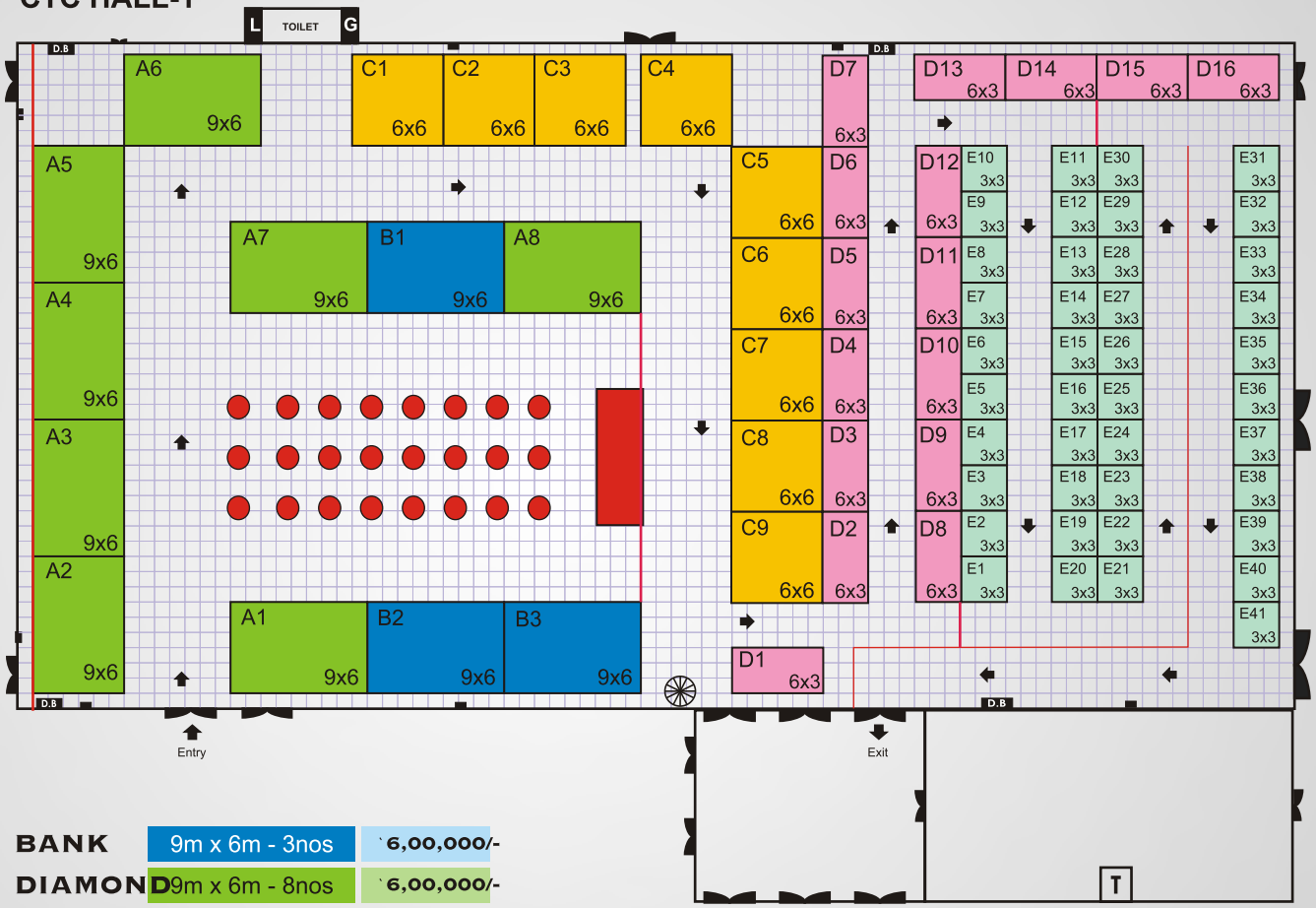

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EVENT ORGANIZED BY
THE SOUTHERN BUILDERS CHARITABLE TRUST

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தமிழக அரசின் Industrial Safety & Health Directorate, சென்னை சார்பாக தொழிலக பாதுகாப்பு மற்றும் சுகாதாரம் பற்றிய பயிற்சி முகாம்.

பயிற்சி முகாமில் கலந்து கொண்டவர்களில் ஒரு பகுதி.

Advance Water Proofing Technology for Terrace & Bathroom பற்றிய பயிற்சி முகாம் - நினைவுப் பரிசு வழங்குதல்.

Advance Water Proofing Technology for Terrace & Bathroom பற்றிய பயிற்சி முகாம் - நினைவுப் பரிசு வழங்குதல்.

Stilt Floor

Er. S.Ramanathan

Stilts or stilt floor means ground level portion of a building consisting of structural columns supporting the super structure done without any enclosures and not more than 2.5 mts. in the height from the ground level for the purpose of parking vehicles, scooters, cycles, etc. This definition is known to every practicing engineer, builder etc; but the purpose of this simple article is to bring to light how comes the name ' stilt ' for such structures.

Stilt is an American wading bird (Himantopus mexicanus) that has long pink legs, black and white plumage, and a long slender bill, and that ranges from the United States to Peru and Brazil..

The legs of the stilt bird will be predominant rather than its body and similarly even in a high rise building the unenclosed stilt columns will be prominent when you view the structure. Thus the ' Stilt Floor' derives its name from the structure of the 'Stilt Bird '.

Stilt Bird

Success doesn't depend on the size of our brain...

It's dependent on the size of our thoughts.

TAXCORNER

S. D. Kannan,
Chairman, Taxation Committee

2. LIMITED LIABILITY PARTNERSHIP (LLP)

2.1 Incorporation Related Forms:

Purpose	Form No.	Fee
Application for DPIN	DIR-3	₹ 500
Reservation of Name	1	₹ 200
Incorporation Document	2	Refer 3.3 (A)
LLP Agreement	3	Refer 3.3 (B)
Consent of all Partners	4	Refer 3.3 (B)

2.2 Other Important Forms:

Events	Form No.	Due date	Fee
Change in LLP Agreement	3	30 days	Refer 3.3 (B)
Change in name/address/ designation of designated Partner/ Partner and consent to become a partner /designated partner	4	30 days	₹ 50/-
Notice for change of Name	5	30 days of Compliance	Refer 3.3 (B)
Statement of Account & Solvency	8	30 days from end of six month from closure of F.Y.	Refer 3.3 (B)
Annual Return of Limited Liability Partnership (LLP)	11	60 days from the end of the F.Y	Refer 3.3 (B)
Intimating other address for service of documents	12	30 Days	Refer 3.3 (B)
Change of place of registered office	15	30 Days	Refer 3.3 (B)

2.3 Filing Fees:

Amount of Contribution	Registration Fee (A)	Documents filling Fee (B)
Upto ₹ 100,000	₹ 500/-	₹ 50/-
₹ 100,000 to ₹ 500,000	₹ 2000/-	₹ 100/-
₹ 500,000 to ₹ 1,000,000	₹ 4000/-	₹ 150/-
More than ₹ 1,000,000	₹ 5000/-	₹ 200/

3 . SERVICE TAX

3.1 Basic Exemption Limit

₹ 10 lacs is available to small Service Provider.

Rate of Service Tax	14%*

* 1.The rate of Service Tax is 12.36% up to 31st May, 2015.
2.The effective rate of service tax will go up by another 2% if and when the Central Government exercises its power to introduce a 'Swachh Bharat Cess' on all or any of the taxable service.

All services will now attract service tax except services specified in the ***Negative List and Exemption Notifications*** (w.e.f. 01-07-2012).

3.2 Service Tax Registration Forms:

Form	Description		Time Period
ST-1	Service Tax Registration Application	To be Submitted By Assesses	Within 30 days from the levy of service tax is brought into force or starting of business or when taxable turnover exceeds ₹ 9 lakh
ST-2	Service Tax Registration Certificate	Issued By Service Tax Dept.	Within 2 days from the date of application otherwise it shall be deemed to have been granted

3.3 Payment of Service Tax using challan GAR-7

S.N.	Assessee	Frequency	Due Date	
			Manual	E-payment*
(i)	Individual/ Partnership firms/ LLP/ Proprietorship	Quarterly	5th of succeeding month	6th of succeeding month
(ii)	Assesses other than Individual/ Partnership firms/ LLP/ Proprietorship	Monthly	5th of succeeding month	6th of succeeding month

*Note : 1. For the period ended March, due date is 31st March
2. E-Payment of the Service Tax is mandatory for **ALL** assesses w.e.f. 01-10-2014.
3. E-Payment will be considered valid up to 8:00 pm of the respective day.
4. If the Assistant Commissioner or the deputy commissioner of central excise, as the case may be, having jurisdiction, may for reasons to be recorded in writing, allow the assesses to deposit the ST by any mode other than internet banking.

3.4 Interest rate for delayed payment:

Extent of Delay	Rate of Interest
For First 6 months	18% p.a.
From 7th month to 12 months	24% p.a.
Beyond 1 year	30% p.a.

Note: 3% concession in interest rate for assesses having turnover up to ₹ 60 Lacs.

3.5 Half yearly Return in Form ST-3

Period	Due Date
1st April to 30th September	25th October
1st October to 31st March	25th April

3.6 Penalties:

Nature of Default	Amount of Penalty
(a) Fees for Late Filling of Return: (Rule 7C)	
Delay upto 15 Days	₹ 500
Delay >15 days to < 30 days	₹ 1,000
Delay > 30 days	₹ 1,000 + ₹ 100 for each day but not exceeding ₹ 20,000
(b) Failure to pay Service Tax (Sec 76). w.e.f. 14.5.2015	(i) Penalty 100% of Service Tax (ii) Penalty Nil, if tax and interest paid within 30 days of service of SCN (iii) Penalty 25% of penalty imposed under an order u/s. 73(2), if the service tax, interest and such reduced penalty is paid within 30 days of receipt of the order*.
(c) Default in obtaining Service Tax Registration Certificate.	Up to ₹ 10,000
(d) Non-maintenance of books of accounts and documents	₹ 10,000
(e) Failure to pay Tax Electronically when required	₹ 10,000

* The maximum penalty imposable u/s. 76 is up to 10% of the tax. Hence the maximum penalty payable in such cases would be 2.5% of Service Tax i.e. (25% of 10%)

Point of Taxation (POT) when there is change in effective rate of taxes:

Point of taxation involving change in effective rate of tax is governed by Rule 4 of the POT Rules, which provides for determination of Point of taxation when there is change in effective rate of tax as mentioned in the table below:

S. No.	In case a taxable service has been provided	Invoice has been issued	Payment received for the invoice	Point of taxation shall be	Applicable Rate
1.	BEFORE the change in effective rate of tax	AFTER the change in effective rate of tax	AFTER the change in effective rate of tax	Date of issuance of invoice or Date of receipt of payment, whichever is earlier	New Rate
2.		BEFORE the change in effective rate of tax	AFTER the change in effective rate of tax	Date of issuance of invoice	Old Rate
3.		AFTER the change in effective rate of tax	BEFORE the change in effective rate of tax	Date of receipt of payment	Old Rate
4.	AFTER the change in effective rate of tax	BEFORE the change in effective rate of tax	AFTER the change in effective rate of tax	Date of receipt of payment	New Rate
5.		BEFORE the change in effective rate of tax	BEFORE the change in effective rate of tax	Date of issuance of invoice or Date of receipt of payment, whichever is earlier	Old Rate
6.		AFTER the change in effective rate of tax	BEFORE the change in effective rate of tax	Date of issuance of invoice	New Rate

Accordingly, the above scenario of advance payments may have exemplary situation and countered as under:

1. **Services are completed after June 1, 2015 but the invoice is raised before change in rate:** In terms of Rule 3 read with Rule 4(b)(ii) of the POT Rules, no differential payment may be required (Refer S. No. 5 of the table);
2. **Services are completed after June 1, 2015 and the invoice is also raised after change in rate:** In terms of Rule 3 read with Rule 4(b)(iii) of the POT Rules, differential payment (i.e. 14% – 12.36%) will have to be paid at the time of such invoice (Refer S. No. 6 of the table).

Service Tax Abatement

1. Transport of goods/ passengers by rail – Hitherto, service tax was payable on 30% of the value of services of rail transport of goods and passengers (with or without accompanied belongings) without any condition. Now, the abatement shall be available subject to the condition that Cenvat credit on inputs, capital goods and input services, used for providing the taxable services has not been taken under CCR, 2004.

2. Goods Transport Agency- Abatement on "Transportation of goods by Goods Transport Agency" was 75% which has now been reduced to 70%.

3. Services provided in relation to chit- Abatement on "Services provided in relation to chit" has been withdrawn.

4. Transport of goods in a vessel– Abatement on "Transportation of goods in a vessel" was 60% which has now been increased to 70%.

5. Transport of passengers by Air– Hitherto, an abatement of 60% was provided on taxable services of transport of passengers by air (with or without accompanied belongings). The said abatement continues for economy class travel and in case of other than economy class the abatement has been reduced to 40%.

Changes made in Service Tax Abatement Provisions with effect from 01/04/2015

Sl. No.	Description of taxable service	Percentage		Conditions
		Taxable Value	Abate - ment	
1	Services in relation to financial leasing including hire purchase (Refer Note-1)	10	90	Nil.
2	Transport of goods by rail	30	70	CENVAT credit on inputs, capital goods and input services, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004
3	Transport of passengers, with or without accompanied belongings by rail	30	70	Same as above
4	Bundled service by way of supply of food or any other article of human consumption or any drink, in a premises (including hotel, convention center, club, pandal, shamiana or any other place, specially arranged for organizing a function) together with renting of such premises (Refer Note-2)	70	30	(i) CENVAT credit on any goods classifiable under Chapters 1 to 22 of the Central Excise Tariff Act, 1985 (5 of 1986) used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.
5	Transport of passengers by air, with or without accompanied belongings in			CENVAT credit on inputs and capital goods, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.
	(i) economy class	40	60	
	(ii) other than economy class	60	40	
6	Renting of hotels, inns, guest houses, clubs, campsites or other commercial places meant for residential or lodging purposes.	60	40	Same as above.
7	Services of goods transport agency in relation to transportation of goods.	30	70	CENVAT credit on inputs, capital goods and input services, used for providing the taxable service, has not been taken **by the service provider** under the provisions of the CENVAT Credit Rules, 2004.
8	Services provided in relation to chit	Omitted Vide **Notification No. 8/2015-ST, Dated: March 01, 2015**		

9	Renting of motorcab	40	60	(i) CENVAT credit on inputs and capital goods, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004;(ii) CENVAT credit on input service of renting of motorcab has been taken under the provisions of the CENVAT Credit Rules, 2004, in the following manner:(a) Full CENVAT credit of such input service received from a person who is paying service tax on forty percent of the value; or(b) Up to forty percent CENVAT credit of such input service received from a person who is paying service tax on full value;(iii) CENVAT credit on input services other than those specified in (ii) above, has not been taken under the provisions of the CENVAT Credit Rules, 2004.
9A	Transport of passengers, with or without accompanied belongings, by-a. a contract carriage other than motorcab.b. a radio taxi.	40	60	CENVAT credit on inputs, capital goods and input services, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.
10	Transport of goods in a vessel	30	70	Same as above.
11	Services by a tour operator in relation to,-(i) a package tour (Refer Note-4)	25	75	(i) CENVAT credit on inputs, capital goods and input services other than the input service of a tour operator, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.(ii) The bill issued for this purpose indicates that it is inclusive of charges for such a tour.
	(ii) a tour, if the tour operator is providing services solely of arranging or booking accommodation for any person in relation to a tour (Refer Note-5)	10	90	(i) CENVAT credit on inputs, capital goods and input services other than the input service of a tour operator, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.(ii) The invoice, bill or challan issued indicates that it is towards the charges for such accommodation.(iii) This exemption shall not apply in such cases where the invoice, bill or challan issued by the tour operator, in relation to a tour, only includes the service charges for arranging or booking accommodation for any person and does not include the cost of such accommodation.
	(iii) any services other than specified at (i) and (ii) above.	40	60	(i) CENVAT credit on inputs, capital goods and input services other than the input service of a tour operator, used for providing the taxable service, has not been taken under the provisions of the CENVAT Credit Rules, 2004.(ii)The bill issued indicates that the amount charged in the bill is the gross amount charged for such a tour.
12	(Refer Note-3)Construction of a complex, building, civil structure or a part thereof, intended for a sale to a buyer, wholly or partly, except where entire consideration is received after issuance of completion certificate by the competent authority,-			(i) CENVAT credit on inputs used for providing the taxable service has not been taken under the provisions of the CENVAT Credit Rules, 2004;
	(a) for a residential unit satisfying both the following conditions, namely:–(i) the carpet area of the unit is less than 2000 square feet; and (ii) the amount charged for the unit is less than rupees one crore:	25	75	(ii) The value of land is included in the amount charged from the service receiver.
	(b) for other than the (a) above.	30	70	

	Note:-
	Note-1 For the purposes of exemption at Serial number 1 – (i) The amount charged shall be an amount, forming or representing as interest, i.e. the difference between the installments paid towards repayment of the lease amount and the principal amount contained in such installments; (ii) the exemption shall not apply to an amount, other than an amount forming or representing as interest, charged by the service provider such as lease management fee, processing fee, documentation charges and administrative fee, which shall be added to the amount calculated in terms of (i) above.
	Note-2. For the purposes of exemption at Serial number 4 – The amount charged shall be the sum total of the gross amount charged and the fair market value of all goods and services supplied in or in relation to the supply of food or any other article of human consumption or any drink (whether or not intoxicating) and whether or not supplied under the same contract or any other contract, after deducting- (i) the amount charged for such goods or services supplied to the service provider, if any; and (ii) the value added tax or sales tax, if any, levied thereon: Provided that the fair market value of goods and services so supplied may be determined in accordance with the generally accepted accounting principles.
	Note-3. For the purposes of exemption at Serial number 12 – The amount charged shall be the sum total of the amount charged for the service including the fair market value of all goods and services supplied by the recipient(s) in or in relation to the service, whether or not supplied under the same contract or any other contract, after deducting- (i) the amount charged for such goods or services supplied to the service provider, if any; and (ii) the value added tax or sales tax, if any, levied thereon: Provided that the fair market value of goods and services so supplied may be determined in accordance with the generally accepted accounting principles.
	Note-4 "package tour" means a tour wherein transportation, accommodation for stay, food, tourist guide, entry to monuments and other similar services in relation to tour are provided by the tour operator as part of the package tour to the person undertaking the tour,
	Note-5 "tour operator" means any person engaged in the business of planning, scheduling, organizing, arranging tours (which may include arrangements for accommodation, sightseeing or other similar services) by any mode of transport, and includes any person engaged in the business of operating tours.

Changes in Cenvat Credit Rules,2004

Rule 4 of the Cenvat Credit Rules: [Notification No. 6/2015-Central Excise (N.T) dated 1-3-2015]

- Cenvat credit shall now be taken within one year of the issue of any documents specified in Rule 9(1) of the Cenvat Credit Rules, whereas, earlier, it was 6 months'.
- Rule 4(7) is being amended that in respect of input service where whole or part of the service tax is liable to be paid by the recipient of service, credit of service tax payable by the service recipient shall be allowed after such service tax is paid.
- Cenvat credit of inputs can be taken immediately where the inputs are directly sent to the job workers premises in pursuance of the direction of the manufacturer or output service provider.
- Cenvat credit on capital goods can be taken immediately where the capital goods are directly sent to the job workers premises in pursuance of the direction of the manufacturer or output service provider.

Rule 5 of the Cenvat Credit Rules:

"Exports goods" now be defined in Rule 5, which means any goods which are to be taken out of India to a place outside India.

Rule 6 of the Cenvat Credit Rules:

Explanation-1 and Explanation-2 inserted in sub-rule 1: For the purpose of this Rule, Non excisable goods covered within the definition of the exempted goods or final products as defined in clauses (d) and (h) of Rule 2 of the Cenvat Credit Rules.

Rule 14 of the Cenvat Credit Rules:

Recovery of CENVAT credit wrongly taken or erroneously refunded: –

1) (i) Instances where the CENVAT credit has been availed wrongly but not utilised, the same shall be recovered from the manufacturer or the provider of output service in terms of the provision of the Section 11A of the Excise Act or Section 73 of the Finance Act, 1994, as the case may be, shall apply mutatis mutandis for effecting such recoveries.

ii)instances where the CENVAT credit has been availed and utilised wrongly or has been erroneously refunded, the same shall be recovered along with interest from the manufacturer or the provider of output service in terms of the provisions of Sections 11A and Section 11AA of the Excise Act or Sections 73 and 75 of the Finance Act, 1994, as the case may be, shall apply mutatis mutandis for effecting such recoveries.

(2) For the purposes of sub-rule (1), all credits taken during a month shall be deemed to have been taken on the last day of the month and the utilisation thereof shall be deemed to have occurred in the following manner, namely: –

(i)the opening balance of the month has been utilised first;

(ii)(ii) credit admissible in terms of these rules taken during the month has been utilised next;

(iii)credit inadmissible in terms of these rules taken during the month has been utilised thereafter.

Rule 15 of the Cenvat Credit Rules:

In the said Rule 15, with effect from the date on which the Finance Bill, 2015 receives the assent of the President, Penalty provisions are changed appropriately as the case may be in terms of Section 11 AC of the Excise Act or Section 78 of the Finance Act.

4. OTHER COMPLIANCES:

4.1 PF & ESIC:

Type	Employee' Contribution	Employer' Contribution	Payment Due Date
PF	12% of Basic + DA + food concession + retaining allowance	12% of Basic +DA + food concession + retaining allowance subject to maximum ₹ 15,000 p.m. (*plus* Admin charges: 1.1% of Basic + DA)	15th day after end of month (plus 5 days of grace)
ESIC	1.75% of Wages	4.75% of wages	21st day after end of month
EDLI	----------	0.5% of total wages subject to maximum ₹ 15,000 p.m. + Admin charges @ 0.01%	15th day after end of month (plus 5 days of grace)

5. USEFUL WEBSITES:

Income Tax :	
Official Website	http://www.incometaxindia.gov.in
e-Filling	http://incometaxindiaefilling.gov.in
Services To Tax payers	http://www.incometaxindiapr.gov.in
Tax information Network	http://www.tin-nsdl.com
ITAT	http://www.itat.nic.in
Service Tax:	
Official Web Site	http://www.servicetax.gov.in
e - Filling	http://www.aces.gov.in
TN VAT	http://www.tnvat.gov.in
CBEC Official Web Site	http://www.cbec.gov.in
EPF	http://www.epfindia.com

6. COMPLIANCE CALENDER

Month	Payment of				TDS	Payment of	Filling of Return	
	Service Tax*/ Excise	TDS	PF	Advance Payment of Income Tax	Return (Quarterly)	ESIC	Service Tax	Income Tax
April	-	30	15			21	25	
May	5	7	15		15	21		
June	5	7	15	15**		21		
July	5	7	15		15	21		
Aug	5	7	15			21		31##
Sept	5	7	15	15		21		30
Oct	5	7	15		15	21	25	
Nov	5	7	15			21		30#
Dec	5	7	15	15		21		
Jan	5	7	15		15	21		
Feb	5	7	15			21		
March	5/31	7	15	15/31		21		

* For Service Tax, if an entity makes online payment, due date is 6 instead of.5

** Only for Corporate Assesses

Submission of Transfer Pricing Report

Extented upto 31st August

Smart Buildings for Smart Cities: An Overview

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Recently, there has been a lot of discussion about smart cities. The Indian government has been talking about building a hundred smart cities. But what are 'smart cities'? Basically it is about embedding the latest digital technologies - from sensors and Big Data to solar panels - in the master plan in order to optimize urban clusters. Cities last centuries and success depends on the ability to constantly adapt to new economic, social and technological contexts. Smart cities are about bringing together smart human capital, institutions and buildings. With stress on energy management in the face of mounting power shortages and security in metros getting top priority, the time has come for planning smart or intelligent buildings. In general we think of smart buildings as being innovative, using advanced technology and materials, contributing to reduced energy usage and the sustainability of the building, and providing more efficient and effective operation. This article gives a brief study of Smart or Intelligent Buildings.

The Smart or Intelligent Buildings

The smart or intelligent building involves "the use of integrated technological building systems, communications and controls to create a building and its infrastructure which provides the owner, operator and occupant with an environment which is flexible, effective, comfortable and secure." There are many interpretations of smart or intelligent design. The main interpretations mostly consider the crucial role of technology without sufficient consideration of social, cultural and user interactions. Other similar studies define smart or intelligent buildings as automated buildings with flexibility, cost-efficiency and integrated technical performances. However, a few studies criticize previous interpretations while arguing that smart buildings must be responsive to the user's actual needs. Smart building accentuates a multi-disciplinary effort to integrate and optimize the building structures, systems, services and management in order to create a productive, cost effective and environmentally approved environment for the occupants. Despite the previous interpretations of the concept of intelligent building, recent studies proclaim that it must create a successful combination between the environment and the occupants. Smart building refer to built environments such as apartments, offices, museums, hospitals, schools, malls, university campuses, and outdoor areas that are enabled for co-operation of smart objects and systems, and for ubiquitous interaction with frequent and sporadic visitors. Prime business scenarios include smart retail environments and public areas providing better service to customers and citizens, and home and office environments making living and working more comfortable and efficient.

According to the Smart Buildings Institute (SBI) in the United States, a smartly-designed building enhances the performance of the building and ease of operation over its life-cycle. The primary goal for a higher-performing building is to minimize the long-term costs of facility ownership to owners, occupants and the environment. In a higher-performing building all components of the building are integrated to work together. This synergy improves operational performance, increases occupant comfort and satisfaction and provides the owner with systems, technologies and tools to manage and minimize energy consumption. Many commercial buildings are, and will continue to be, built to be dynamically changing high-tech facilities. These high-tech buildings are designed to provide efficient and cost-effective environments for the information-age-based worker. This is accomplished through optimization of its structure, systems, services and management as well as the interrelationships between systems. Productivity is the driving force in designing and building these high-tech buildings for the highly mobile worker. These buildings are required to be easily adaptable to different functional uses such as open or closed workspaces, factory space, and other configurations. These buildings are becoming known as "smart or intelligent buildings" that optimize information services such as voice, data, video, energy

conservation/monitoring (including lighting, heating, ventilation and air conditioning [HVAC]), fire alarm, security and access control, lighting control and process control (in-factory environments).

The field of Intelligent Buildings, Intelligent Homes, Building Management Systems (BMS) encompasses an enormous variety of technologies, across commercial, industrial, institutional and domestic buildings, including energy management systems and building controls. The function of Building Management Systems is central to 'Intelligent Buildings' concepts; its purpose is to control, monitor and optimise building services, eg., lighting; heating; security, CCTV and alarm systems; access control; audio-visual and entertainment systems; ventilation, filtration and climate control, etc.; even time & attendance control and reporting (notably staff movement and availability). The potential within these concepts and the surrounding technology is vast, and our lives are changing from the effects of Intelligent Buildings developments on our living and working environments. The impact on facilities planning and facilities management is also potentially immense. Any facilities managers considering premises development or site relocation should also consider the opportunities presented by Intelligent Buildings technologies and concepts. This free summary article is contributed by Gary Mills, a leading UK-based expert in the field of Intelligent Buildings, Intelligent Homes, and Building Management Systems. The origins of Smart or Intelligent Buildings and Building Management Systems have roots in the industrial sector in the 1970's, from the systems and controls used to automate production processes and to optimise plant performances. The concepts and applications were then adapted, developed and modularised during the 1980's, enabling transferability of the technology and systems to the residential and commercial sectors.

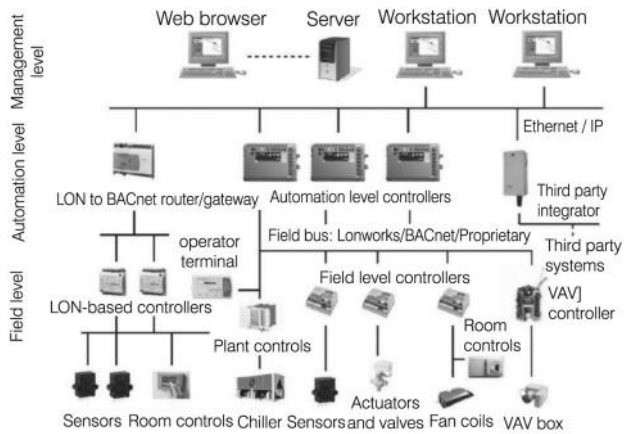
Attributes of Smart Buildings

Defining the attributes of a smart buildings are too complex and the features of a smart building too numerous. The following major attributes makes the framework of a smart building:

- Physical Infrastructure
- Communication/Data Infrastructure Network and Security System Integration
- HVAC Electrical
- Digital Lighting Control System
- Plumbing and Water Access Control System (ACS)
- Video Surveillance System Fire Alarm Audio/Visual
- Metering Occupant Satisfaction
- Sustainability and Innovation
- Integrated Building Management System Facility Management

Building Management System (Bms)

Building Management Systems (BMS) is central to 'Intelligent Buildings' concepts; its purpose is to control, monitor and optimise building services, eg., lighting; heating; security, CCTV and alarm systems; access control; audio-visual and entertainment systems; ventilation, filtration and climate control, etc.; even time & attendance control and reporting (notably staff movement and availability). To improve the energy efficiency, systems may be integrated to internal monitoring of the smart building passes to determine when an area is no longer occupied. The BMS may then be configured to allow energy-saving measures to be automatically implemented, e.g. reducing lighting and air conditioning.



The control theory

The essence of Building Management Systems and Smart or Intelligent Buildings is in the control technologies, which allow integration, automation, and optimisation of all the services and equipment that provide services and manages the environment of the building concerned. Programmable Logic Controllers (PLC's) formed the original basis of the control technologies. Later developments, in commercial and residential applications, were based on 'distributed-intelligence microprocessors'. The use of these technologies allows the optimisation of various site and building services, often yielding significant cost reductions and large energy savings. There are numerous methods by which

building services within buildings can be controlled, falling broadly into two method types:

- Time based - providing heating or lighting services, etc., only when required, and
- Optimiser Parameter based - often utilising a representative aspect of the service, such as temperature for space heating or illuminance for lighting.

Heating and Cooling - time-based control

Time-based controls can be used to turn on and off the heating system (and/or water heating) at pre-selected periods (of the day, of the week, etc). Optimiser Parameters: whatever the conditions, the controls make sure the building reaches the desired temperature when occupancy starts.

Optimiser parameter-based (temperature) control examples

- Temperature control: protection against freezing or frost protection generally involves running heating system pumps and boilers when external temperature reaches a set level (0°C).
- Compensated systems: will control flow temperature in the heating circuit relative to external temperature. This will give a rise in the circuit flow temperature when outside temperature drops.
- Thermostatic radiator valves: these sense space temperature in a room and throttle the flow accordingly through the radiator or convector to which they are fitted.
- Proportional control: involves switching equipment on and off automatically to regulate output.
- Other methods can include thermostats, occupancy sensing PIR's (passive infra-red sensors), and manual user control.

Lighting control methods

Different control systems exist, again time-based control and optimiser parameter-based where a level of illuminance or particular use of lighting is required.

- Zones: lights are switched on corresponding to the use and layout of the lit areas, in order to avoid lighting a large area if only a small part of it needs light.
- Time control: to switch on and off automatically in each zone to a preset schedule for light use.
- Passive Infra-Red (PIR) Occupancy sensing: In areas which are occupied intermittently, occupancy sensors can be used to indicate whether or not anybody is present and switch the light on or off accordingly.
- Light level monitoring: this consists of switching or dimming artificial lighting to maintain a light level measured by a photocell.

Building Management Systems (BMS) and Smart Buildings: Energy Savings

Until recent years, energy efficiency has been a relatively low priority and low perceived opportunity to building owners and investors. However, with the dramatic increase and awareness of energy use concerns, and the advances in cost-effective technologies, energy efficiency is fast becoming part of real estate management, facilities management and operations strategy. The concepts are also now making significant inroads into the domestic residential house building sectors.

For lighting, energy savings can be up to 75% of the original circuit load, which represents 5% of the total energy consumption of the residential and commercial sectors. Energy savings potential from water heating, cooling, or hot water production, can be up to 10%, which represents up to 7% of the total energy consumption of the domestic residential and commercial sectors. Experiences from studies in Austria suggest potential heating and cooling energy savings are up to 30% in public buildings. Even allowing for the fact that buildings used in the study may have been those with particularly high energy usage, the figure is an impressive one. (Source: EU2 Analysis and Market Survey for European Building Technologies in Central & Eastern European Countries - GOPA)

BMS and Smart Buildings: Environmental and Greenhouse Gas Benefits

Greenhouse gas emission reductions depend on and correlate to reductions in energy use. Intelligent Buildings and Building Management Systems technologies contribute directly to the reduction in energy use, in commercial, industrial, institutional and domestic residential sectors. In short, Intelligent Buildings and suitably applied Building Management Systems are good for the environment. Legislation and environmental standards; health and safety regulations; and global trends towards improving indoor air quality standards are all significant drivers of - and provide a continuous endorsement of the need for - Building Management Systems and the Intelligent Buildings technologies. Government Initiatives around the world are also

driving the development and adoption of Building Management Systems technologies. For example the UK Carbon Trust allows Enhanced Capital Allowance (ECA) to be offset against taxation on energy efficient systems, which enables savings of around 30% for all energy-related Building Management Systems and Intelligent Buildings equipment, and the associated installation and design costs.

BMS and Smart Buildings: Market Trends

In the UK, adoption of controls technologies into the new build and major refurbishment sectors is relatively high: Estimates a few years ago of the UK market for Building Management Control Systems for new build and major refurbishment, all sectors, suggest market adoption of (as at 1994 - Source UK1 An Appraisal of UK Energy RTD, ETSU -1994).

- Heating controls 70%
- Hot water system controls 90%
- Air conditioning controls 80%

However according to European Commission as many as 90% of all existing buildings have inapplicable or ineffective controls, many of which require complete refurbishment of control systems. Moreover conventional control systems stop short of automated Intelligent Buildings full capabilities. A significant human element is required for optimal effective operation even if control systems correctly specified and installed. Given typical installations and equipment there is often a difficulty for building occupants (residential) or managers (commercial) to operate them correctly. Usage and correct operation are vital for effective results. Education of users; improved systems-design user-friendliness, and the provision of relevant instructions and information are all critical to enable theory to translate into practice, and for potential effectiveness and savings to be realised.

BMS and Smart Buildings: Practical Benefits

Energy-effective systems balance a building's electric light, daylight and mechanical systems for maximum benefit. Enhanced lighting design is more than an electrical layout. It must consider the needs and schedules of occupants, seasonal and climatic daylight changes, and its impact on the building's mechanical systems.

Lighting Systems

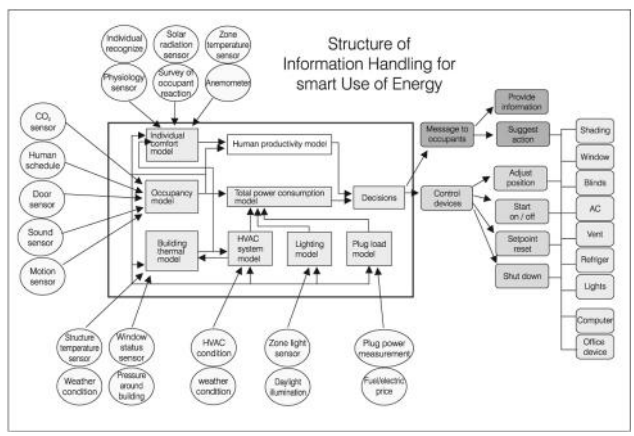
Adding daylight to a building is one way to achieve an energy-effective design. Natural daylight 'harvesting' can make people happier, healthier, and more productive. And with the reduced need for electric light, a great deal of money can be saved on energy. Nearly every commercial building is a potential energy saving project, where the electric lighting systems can be designed to be dimmed with the availability of daylight. Up to 75% of lighting energy consumption can be saved. In addition, by reducing electric lighting and minimizing solar heat gain, controlled lighting can also reduce a building's air conditioning load.

Mechanical systems

The HVAC system and controls, including the distribution system of air into the workspaces, are the mechanical parts of buildings that affect thermal comfort. These systems must work together to provide building comfort. While not usually a part of the aesthetics of a building, they are critical to its operations and occupant satisfaction.

The number one office complaint is that the workplace is too hot. Number two is that it's too cold.

Many people cope by adding fans, space heaters, covering up vents, complaining, conducting 'thermostat wars' with their co-workers, or simply leaving the office. Occupants can be driven to distraction trying to adjust the comfort in their space. Improper temperature, humidity, ventilation, and indoor air quality can also have significant impacts on productivity and health. When we are thermally comfortable we work better, shop longer, relax, breathe easier, focus our attention better.



In order to provide a comfortable and healthy indoor environment the building mechanical system must:

- Provide an acceptable level of temperature and humidity and safe guard against odours and indoor air pollutants.

- Create a sense of habitability through air movement, ventilation and slight temperature variation.
- Allow the occupant to control and modify conditions to suit individual preferences.

Case Study: Hong Kong and Shanghai Banking Corporation (HSBC), Hong Kong

The headquarters of Hong Kong and Shanghai Banking Corporation (HSBC) is located along the southern side of Statue Square near the location of the old City Hall, Hong Kong. The new building was designed by the British architect Lord Norman Foster and civil & structural engineers Ove Arup & Partners with service design by J. Roger Preston & Partners, and was constructed by Wimpey International. From the concept to completion, it took seven years (1978–1985). The building is 180 metres high with 47 storeys and four basement levels. The building has a modular design consisting of five steel modules prefabricated in the in Glasgow, UK and shipped to Hong Kong. About 30,000 tons of steel and 4,500 tons of aluminium were used. Conceived as a minimalist glass envelope, the new lobby is designed to be deferential to Foster's structure and appears almost to be part of the original.

The building is also one of the few to not have elevators as the primary carrier of building traffic. Instead, elevators only stop every few floors, and floors are interconnected by escalators.

The main characteristic of HSBC Hong Kong headquarters is its absence of internal supporting structure. Another notable feature is that natural sunlight is the major source of lighting inside the building. There is a bank of giant mirrors at the top of the atrium, which can reflect natural sunlight into the atrium and hence down into the plaza. Through the use of natural sunlight, this design helps to conserve energy. Additionally, sun shades are provided on the external facades to block direct sunlight going into the building and to reduce heat gain. Instead of fresh water, sea water is used as coolant for the air-conditioning system. All flooring is made from lightweight movable panels, under which lies a comprehensive network of power, telecommunication, and air-conditioning systems. This design was to allow equipment such as computer terminals to be installed quickly and easily. Because of the urgency to finish the project, the construction of the building relied heavily on off-site prefabrication; components were manufactured all over the world. For example, the structural steel came from Britain; the glass, aluminium cladding and flooring came from the United States while the service modules came from Japan. The inverted 'va' segments of the suspension trusses spanning the construction at double-height levels is the most obvious characteristic of the building. It consists of eight groups of four aluminium-clad steel columns which ascend from the foundations up through the core structure, and five levels of triangular suspension trusses which are locked into these masts.

Challenges Faced by Smart Building Popularity in India

Just like other developing countries in the world, India is also facing challenges in development of Smart or Intelligent Buildings. Some of the challenges faced are:

- Most architects and builders are unable to quantify and qualify the benefits of Smart or Intelligent Building technologies to owners, thus owners are unwilling to support them. Often there is a mismatch between the expectations of the owner and the deliverables in the buildings.
- For energy efficient design it is essential to do energy simulation. These simulation tools need accurate climatic data of the region where the building is planned. There are a very few cities for which such

data is available in a readily useable format as required by these software.

- For reliable energy simulation it is essential to get accurate material properties such as thermal conductivity, density etc. For most of the materials used in construction in the country such material properties are not known. Even if the properties of material in one batch are measured, it is not certain that all the batches of material will have the same properties as the method of manufacturing is not standard.
- The concept of energy service companies (ESCOs) is still not popular in the country
- Expert services are required to install and integrate building automation technology, lack of which leads to poorly functioning systems. Further, there is very less self calibration, self diagnostics and self repair in the current devices, making them difficult to install and repair. Faulty installations due to negligence or little knowledge of the systems can actually lead to more energy consumption instead of energy saving. Moreover, there is hardly any monitoring of the buildings to evaluate the proper functioning and benefits attained by use of such technologies.
- Coordination of roles and responsibilities of various agencies is difficult because automation hardware and software cuts across many building components. In India the building sector is unorganized and there is hardly any integrated approach to design of buildings. Architects at the design time are not able to design the buildings keeping in mind the latest components and their interaction with the shell and the occupants. Building controls is also treated as a service which can be fitted by a supplier after all the building design has been frozen by the architect.
- There are nearly no computer simulations performed at the design time to evaluate the performance of the building. Most of the building designers do not use IT tools for evaluating various parameters such as energy consumption, HVAC and Lighting performance, comfort levels, Life Cycle Cost etc.
- Majority of the buildings constructed in the country are designed keeping in mind the first cost or the construction cost. As the spaces will be leased out to different organizations and the organizations will be bearing the running expenses, there is no incentive for the developers to invest more on the initial cost and reduce the operational costs.
- Occupant's productivity is not given its due weightage. Owners have to be sensitive to the requirements of the occupants and the same has to be conveyed to the architects so that the spaces can be designed in such a way that the productivity can be enhanced.

Conclusion

Technology already exists to transform today's buildings into tomorrow's smart or intelligent buildings. The key to modernization is to educate one and all involved in building industry so that they can communicate better and understand the value of implementing these technologies. It is clear, that the Information Age is here-now, and it will continue to change and improve the way we build. A lot has to be done to accelerate the growth of smart or intelligent building concept in India. This includes awareness campaigns for users, builders and promoters. Short courses and inclusion of the technological aspects in the bachelor programmes will help in educating the practising and future architects to be ready for development of Smart or Intelligent Buildings. It is also felt that specialized masters programmes in smart building and building science are the need of the hour to address this growth of new generation buildings. Further, there is an immediate need of demonstrations of smart or intelligent buildings and clear proof of benefits. The Platinum rated CII-Sohrabji Godrej Green Business Center in Hyderabad is one such example. It has promoted the concept and accelerated the growth of green buildings with a huge thrust. Similar demonstrations in smart building in various parts of the country will give an impetus to this concept. We further need positive reinforcement of the message that better building performance affects efficiency, safety and productivity of occupants, and that it can only be achieved through the improved use of information technology and latest systems in buildings.

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