

IPT ROUND TABLE DISCUSSION



Indian Plumbing Industry - An Effort to Seek Clarity

IPT continually seeks views from a wide cross section of professionals on plumbing related matters. IPT Round Table is one such endeavour where a panel of experts respond to a series of questions on a variety of topics pertinent to the profession. The purpose is to obtain different perspectives relating to matters of topical interest. The views expressed by the respondents are their own and IPT assumes no responsibilities for them. The contributors may be contacted at their respective mail ids' furnished at the end of the article.

THE PANELISTS



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Majority of contracts now stipulate that the contractor should prepare 'shop drawings' and get them approved from the consultant. Is this a good practice? What is the difference between a 'shop drawing' and 'working drawing'?

HRR: Working drawing shall contain the requisite complete working details clearly indicated with proper inter-services coordination for the work to be carried out by the contractor. Whereas, the shop drawings covers the vendor specific details for bought out equipments such as base frame details, foundation pocket dimensions, GA drawings with suggested mounting details with associated accessories etc. with few exploded views of fixing arrangements of fixtures, pipes in the shafts etc.

MKG: Generally "Good for Execution" drawings as issued by the consultant should be good enough for working purpose. However, as per prevailing practices, lots of changes are being done after the issuing of GFC drawings either by Architect or by Owner or due to site conditions. In that case, it becomes necessary to get the shop drawings prepared by the engaged executing agency, as per prevailing situation. For plant room & STP, a shop drawing is necessary, after selection of exact models for pumps and equipments.

SR: In my opinion the working drawing should be as good as a shop drawing such that the contractor must not find any difficulty in executing the work. Shop drawing can give some more details; for example, in the case of toilets, the piping and fixture positions will have to be coordinated with the interior tile layout.

PR: A Shop Drawing in my opinion, refers to a detailed drawing showing the proposed material, shape, size and assembly of parts of a machine or device, and specifications on how the entire unit will be installed or made operational. A working drawing in effect renders the same purpose but deals with installations. In the world of Electro-Mechanical and Plumbing services, working drawings deal with entire installations of plumbing, air-conditioning and electrical to name a few services. A working drawing may include shop drawings but in totality deals with the process of installation of an entire building service. In current industry parlance the terms are often interchanged.

VVS: Shop drawings by Contractors shall be limited only to the required Shop fabricated items like Pumps, Treatment plants etc which vary from vendor to vendor, based on their practice. Foundation details may vary due to this and hence the Contractor is expected to submit fabrication details with foundation details. The Construction drawings issued by Consultants are supposed to be coordinated with all other services and cannot be redone by Contractor.

DM: The concept of preparation of shop drawings is totally wrong. When a project is conceived, entire team of designers and client work to justify everyone's requirement and achieve desired design intent. Normally it takes three to nine months depending on project type, size and location. It has been observed that several times, while preparing shop drawings, the original design intent is changed. Also, it requires more time to check, comment and approve shop drawings. It is much preferred that the principal design consultants prepare shop drawings. There is not much difference between shop drawings and working drawings if, while preparing it, site conditions and other services / structural drawings are studied well.

Contracts usually include 'list of approved materials' with alternative products/vendors. How should the contractor interpret this during tendering and execution of the contract?

HRR: List of 'approved makes' indicated in the contract gives a fair idea about the 'equivalent makes' preference-wise intended to be used in the project. The cost variance, if any, between these preferences

should be brought out during tender/commercial closure stage and price impact if any should be agreed upon. This will certainly help during the execution stage and delay/non-availability of any one of the make indicated will not impact the timeline of the project.

MKG: In my opinion, it should be very clearly mentioned as a footnote in the list of approved makes that "The Contractor must quote their rates based on the first recommended make". In case of any changes or variation in the make, it must be discussed and formalized while agreeing to the final price and making the final agreement by the Owner with the Contractor. Also, during the execution of the work, there may be a situation where the approved make is not available due to some circumstances, in which case the alternative make may be selected with the mutual consent of all concerned.

SR: Normally two to three makes of reputed manufacturers are included and the contractor must quote for the first make. The logic of providing other equivalent makes is to have a backup option in case of non-availability of the first make or any other issues that may crop up with the quoted make. But sometimes it is seen especially in case of pumps, PRVs' and other such big ticket items, the recommended manufacturer hikes up his prices or sometimes, gives varying prices depending on his relation and past experience with the contractor. I agree that this issue of recommended makes is a bone of contention in every tender.

PR: This is a question which is often interpreted differently by the contractor and the decision-maker from the client's side. Assuming two or three manufacturers are mentioned as approved against a particular material or item, I believe that the right to choose a manufacturer from within this list rests with the contractor. The conflict arises when the client insists on a specific make from the list. This is unfair.

VVS: In the tender, makes are specified considering the quality, performance and cost aspects. It is the responsibility of the specifier to see that the quality/ performance/ cost are almost at par for the brands specified. Out of specified makes, the tenderer shall choose the make comfortable to him based on their relationship with vendor. After specifying three-four makes, there is no point in insisting on a particular make/ first make in list. The problem arises in case of specific models which are selected by architects/ interior designers. All such products shall be specified in advance in the tender itself.

DM: List of approved material - this term should be used very carefully. There are very few products available in the market, which are technically and commercially, equivalent. When we specify alternative products or makes, the contractor will always prefer and use what is available to them at a cheaper rate. So it is always better to finalize product and make while concluding contract to avoid conflict during execution.

It is common knowledge that implementation of safe plumbing practices in buildings requires active participation of the architects who lead the construction team on projects. What is the level of interaction required between the Architect and Plumbing Professionals?

HRR: Participation of the Architect and Plumbing Design Engineers during planning stage certainly helps in achieving safe plumbing in the facility for its intended use. This will certainly help to achieve leak proof/ user-friendly building for the client and unnecessary recurring maintenance efforts towards upkeep of the building. This will also help in unwarranted structural damage due to improper planning while fixing the toilet fixtures / accessories.

MKG: This is a very important issue and I think that the Plumbing Consultant and Architect should work together from conception of the project so that proper coordination and planning is done to avoid any future complications. For example, setting out the final ground level and the sizes of cut-outs for various plumbing installations should be properly discussed and finalized at this stage.



SR: The architect and the plumbing consultant should be on board from day one of the project. The very first input the structural consultant requires is the location of the water tanks and if there is a basement, the issue is still more complex. It is a well known fact that most of the buildings suffer because of bad plumbing which is due to both bad planning/ design and faulty workmanship.

PR: It was the American Architect Louis Sullivan who famously said that “form ever follows function.” This was the “Law” which architects such as Frank Lloyd Wright, Le Corbusier and Walter Gropius to name a few icons, had accepted as sacrosanct in design. An architect ignores the demands of building services in his design at his peril. Plumbing, because of the very nature of the service it provides and the fact that it is live, 24/7, has to be given consideration right from the design conceptualization stages. Ease of installation and maintenance have to be built into the design fundamentals. Consequently, the level of interaction between the Architect and the Plumbing Professional has to be one of mutual respect if the ultimate product has to be ‘healthy’.

VVS: The Architects shall have fairly good knowledge about Plumbing practices to ensure Safety and reliability and ease in Operation and maintenance of the system. If proper shafts and spaces are not allocated at the initial stages of drawings, it will be a nightmare for the execution and maintenance of plumbing systems. Plumbing professionals shall interact on all issues related to routing of pipelines, spaces earmarked for Storage tanks, Pump rooms, Treatment plant rooms and especially with rain water down takes, which is becoming a tough job with glass façade buildings.

DM: Actually, the interaction between Architects and Plumbing / Services Consultant should start when the Architect conceives his first design sketch. It will not only save time, but also will be easier for the Architect and the Structural Consultant to accommodate plumbing requirements from day one. We all are aware that sometimes plumbing has major impact in even the architectural elevation of buildings. Generally, two levels of interactions are required between the Architects and Plumbing Consultants – first at an initial /conceptual stage and second, at design development stage. However, several more interactions may be required based on the importance /complexity of the project and design process.

Some statutory authorities stipulate that grey and black water should be piped separately to Sewage Treatment Plants. Is this advantageous? Does this not preclude modern and economical one-pipe-drainage systems propagated by UPC-I and other international plumbing codes?

HRR: A Sewage Treatment Plant (STP), if properly designed and maintained, delivers good quality treated waste water for its intended reuse either in flushing, landscape irrigation system. Segregation of black and grey water from source upto STP will have an impact on additional piping and appurtenances cost apart from constraint of space it occupies for installation in shafts / at ground level. Further there will be additional treatment cost for grey water with the duplication of the treatment units if segregated.

MKG: This is an issue which is being addressed in many countries in their own ways. Some authorities prefer the combined system by designing a central treatment plant, while in some countries, authorities prefer the separate disposal in which case, the black water goes to municipal sewer for further treatment and grey water is to be locally treated for reuse. However, in my opinion, the preference should be not to segregate grey and black water, but to combine it and convey it to a common sewerage treatment plant.

SR: This is more a problem of mindset and stigma attached with using recycled black water. A properly designed STP can deliver the desired results, if they are well-operated and maintained, which in most cases does not happen leading to coloured and foul-smelling recycled water. Agreed that the grey water will have much lower organic and solid content and the desired result can be achieved with filtration, disinfection and some aeration, but the point is that this plant also needs to be maintained and serviced.

Besides, there is also a substantial addition in cost due to duplication in piping, chambers and treatment units.

PR: Separation of grey and black water does not serve any meaningful purpose. Experts in sewage treatment opine that it is easier and more economical to treat combined flow than separate grey and black streams. A combined flow installation would also be more cost effective. Further, in these days of waterless urinals and reduced flush volumes for water closets, the quantum of effluent is drastically reduced, which, I suspect will reduce sewage travel lengths substantially. Add to this the complication of toilet paper and we have a perfect recipe for Dry Drains and subsequently blocked drainage pipes. On installations such as Hotels and Resorts which have seasonal occupancy this problem is likely to be further aggravated. To my mind the flows should be combined. This will give the plumbing designer the scope to propose one pipe drainage systems propagated by UPC - I and other international codes.

VVS: There shall not be any problem with single stack systems for many types of occupancies like residential/ commercial etc. provided the job is executed as per UPC-I. In many cases the piping is not interconnected as specified in UPC and creates a problem. In fact, it may be preferable to go with single stack system to ensure minimum flow velocities in sewer lines. However, for occupancies like hospitals, the waste lines from many areas like Labs, CSSD, Scrub areas, (even from Outpatient / Inpatient areas, wash basins due to cleaning of fixtures with Lizol) include chemicals which shall be neutralized before letting into STP. Otherwise, bacteria may not survive. NABH/ JCI insist on this. Even UPC specifies two-stack system wherever chemicals are handled. Hence, two-stack system is justified only for such occupancies.

DM: Day by day, we are decreasing flushing volumes to conserve water. This has resulted into reduction in water volume required to flush drainage lines or to carry sewage to the disposal point. Various studies are being made to examine behavior of drainage lines under the reduced flow and concrete output is awaited. One needs to understand the requirements for metros, towns and villages separately, while taking a decision on one pipe or two pipes systems. Local factors still govern the design aspects.

Plumbing codes stipulate that rain water should be used only for non-potable purposes such as flushing, HVAC make up, water bodies, irrigation etc. Can rain water after appropriate treatment not be used for potable applications?

HRR: Rain water certainly can be used for potable purpose if treated properly with properly engineered collection system by way of proper segregation of rain water from terrace and surface. By this we can surely preserve the precious "Blue Diamond" for our next generation and prolong the Third World War if it happens for water.

MKG: Yes, it should be used for domestic purpose provided proper treatment is planned and quality of water is maintained.

SR: Rain water, if treated can positively be used for bathing, washing and other such uses. It can be used for drinking also, but it would be safer to use dedicated domestic water only for drinking.

PR: I am firmly of the opinion that to restrict usage of harvested rain water only for flushing, HVAC make up, water bodies and irrigation is short-sighted. With fool proof arrangements to ensure that the run-off from the first few rains are led away, the balance rain water, adequately treated can be used for potable application. Most projects we have associated with, in Kerala especially use this water for domestic purposes. The answer therefore is an emphatic 'Yes', that rainwater, with adequate treatment, can be used for potable purposes.



VVS: Rain water from unpolluted air is pure water if it is directly collected into a container for usage. But rain water collected from rooftops generally contains debris, dead insects and bird droppings. Many of the rain water samples, (from buildings and harvested into a tank without letting out first rain) indicate microbial contamination and presence of pathogens. Storage tanks can serve as breeding sites for mosquitoes including species that spread dengue virus. Rain water is slightly acidic and very low in dissolved minerals. Regular testing and treatment of rain water is essential, if it is to be used for drinking. Due to the reasons stated above, harvested rain water is therefore, not recommended as primary source of drinking water.

DM: In earlier days, rain water was being considered as the cleanest form of water after water from glaciers. At present, doubts are being raised on quality of rain water due to very heavy air pollution. However, rain water is still much better source of water against ground water which is even more contaminated / polluted than rain water. Rain water can defiantly be used for potable applications with suitable treatment. Worldwide, rain water is still the major source of water supply through rivers, lakes etc. and for recharge of ground water.

'Green' is the buzzword today. How far are green plumbing practices implementable and beneficial to the end user?

HRR: Green practices in plumbing will greatly impact on preserving the precious potable water "Blue Diamond" for our next generation. It would be beneficial if Government declares subsidies with incentives for green practices and penalties for non-compliance. Then there would be awareness among the users and they will also learn to respect nature and its limited resource. I would suggest that these initiatives be included as part of the education curriculum / syllabus to enable the younger generation to be aware of the criticality of this issue and respond to the call as "good citizens" of the universe.

MKG: Practice of "Green Technologies" and in particular, "Green Plumbing" are not new concepts, as these have been widely adopted since many years by our ancestors in their own ways, e.g. "Rain Water Harvesting", "Recycling" etc. With the present scenario, we should implement it, but in a practical, hygienic and user- friendly way.

SR: 'Green' practice is to be encouraged such that less of natural pure water is consumed and more of recycled water is used wherever it is possible. There should be a Government induced incentive both for the provider (developer in our case) and the end user, then only this initiative will become viable and implementable.

PR: 'Green' plumbing where there is stress on water conservation through efficient design, use of water conserving fixtures, rainwater harvesting, use of solar energy for water heating is definitely the order of the day. When water is saved, automatically power consumption is economized. Lesser water demand leads to more compact water treatment plants, sewage treatment plants, hot water systems and smaller sized pumps. For this movement to be truly effective, the user has to be educated on the necessity to conserve and sustain our ecosystem. Simultaneously, legislation should be brought about to reward or penalize consumers based on their usage. Codes specifying practical 'Green' codes such as Green Plumbing Code Supplement India and use of products rated for their efficient as under the WEP- I of IPA should be made mandatory.

However there are a few caveats. To highlight a few:-

- There is no single solution for Rainwater Harvesting in all geographic areas. Solutions have to be tailor made to suit soil conditions and storage possibilities.

- Insistence on solar hot water systems may be counter-productive in areas with heavy rainfall and substantial cloud cover.
- We cannot reduce consumption of water to the point where it encourages unsanitary condition under the excuse of conserving water.

VVS: Water is the most essential element for survival of mankind and at the same time major concern due to depletion of potable water. Any move towards reduction of water usage is a welcome sign. Green Buildings talk about Water use reduction in Landscaping/ Air Conditioning, Efficient fixtures and reuse of Grey water. In my opinion all are implementable and definitely beneficial to the society, though may not be directly advantageous to an individual. For example, in one of the gated communities, water use has come down from around 50KL per month to 25KL per month by fixing water meters and charging based on consumption. Water audits must be made mandatory and wastage shall be avoided at any cost.

DM: Green has become buzzword today but it is still restricted to developed/developing cities. If you look back to the very ancient construction in India, it is very clear that most of them are still to be recognised as green buildings. Mandu, Jaipur, Ahmedabad are a few places where classic examples of green construction practices exist. It begins with natural cooling, use of natural light, rain water collection and reuse, use of natural resources for construction etc. Definitely, green plumbing practices are implementable and beneficial to the end-user and to the world, if it follows regional parameters. Copy of green concepts from other part of world may not help, since the requirements and availability of resources will vary from region to region. ■■

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