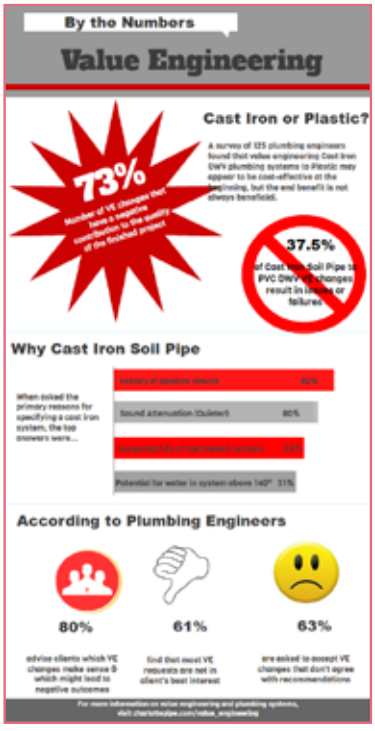
HELP AVOID VALUE ENGINEERING PROBLEMS AND LITIGATION

CHARLOTTE PIPE AND FOUNDRY COMPANY

Value Engineering (VE) in its original context is not a bad thing. The process is designed to optimize the resources available, including money, time and materials. However, it is not meant to compromise the integrity of the project.



Unfortunately, value engineering has become a cost-cutting practice that can not only compromise the building project, it sometimes results in higher costs for the owner and litigation for contractors, engineers and others involved. This is especially true when it comes to substituting plastic for cast iron plumbing systems. In fact, a study of plumbing engineers found that 61% of VE requests they received were not in the client's best interest. Also, 37% of respondents felt that switching from cast iron soil pipe to PVC DWV in commercial construction could result in issues or failures.

This was the case for a healthcare facility in the southeastern United States. John Neal was the plumbing designer. Six months after the facility was occupied, he received a call that the pipe below the kitchen floor was collapsing.

After further research, he discovered that the original specification for cast iron pipe and fittings had been value engineered to PVC pipe and fittings. The PVC was connected to a 190° F commercial dishwasher. However, PVC is intended for applications where the operating temperature will not exceed 140° F. Due to the high temperature, the piping system failed. The solution? The building owners had to dig up the floor and replace the PVC system with a cast iron system.

Another value engineered project, which is currently in litigation, is a university stadium in the Midwest. Almost two years after completion, a break in a plastic drain pipe was found. Upon further inspection, 15 separate breaks were found in the piping system, as well as a blockage caused by gravel in the pipe. The university and its insurers are asking for unspecified damages in excess of $75,000. Defendants in the case include the general contractor, a construction company, the architectural firm and product manufacturers.

As a manufacturer of both cast iron and plastic pipe and fittings, Charlotte Pipe understands the importance of choosing the right plumbing material for the application. To help with this decision, we have created free resources that are available on our website, charlottepipe.com/ve.

One of these resources, our value engineering brochure, highlights general considerations for choosing a plumbing system, including elevated temperatures. As the above healthcare project illustrates, elevated temperatures can cause a PVC system to fail. PVC is rated at a maximum temperature of 140° F while cast iron soil pipe is rated at 212° F. While many systems have controls limiting the maximum temperature in a system, this is not a guarantee against failure. It is important to consider if the system can be manipulated to override max limits. Also, remember that quick-cure concrete can exceed 140° F and that autoclave or boiler condensate may be errantly drained into the system.

Another consideration is that cast iron soil pipe has standard charts for crush rating, so trench preparation and backfilling during underground installation have minimal instructions. PVC pipe has very specific instructions for the dimensions of the trench as well as the bedding and backfill material of the trench. It also has proper backfill methodologies that are outlined in ASTM D 2321, which can add time and cost to the installation.

The brochure also covers thermal expansion considerations, sound attenuation, combustibility and use in plenum spaces, hanger spacing/fall and more.

Another resource available is a checklist of considerations for a cast iron to PVC VE discussion. The checklist follows a simple yes/no format and can be included in project documents throughout the process. It is available in the brochure and as a pdf for download on our website.

To see John Neal share his story, get more information on the survey mentioned above, or download our free value engineering resources, including whitepapers and more, visit www.charlottepipe.com/ve.