

Exploring the Use of Wire Hangers in Mechanical Construction

a John R. Gentile Foundation Research White Paper



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Recently, the John R. Gentile Foundation held substantive conversations with three mechanical contracting firms to learn more about their approach to selecting hanger systems. This study explores production options, installation preferences, and financial considerations. All three companies used threaded rod as their standard method for hangers and prefabricated them in their off-site facilities.

This white paper explores the importance of hanger production time, drawing on insights from industry case studies for your analysis and consideration.

The use of wire hangers in construction has been utilized for a number of years with sheet metal and electrical systems and has become an accepted practice within those trades. The wire hanger systems are faster to install and maintain, yet are found to be equally reliable. They have been accepted by engineers, architects and code bodies for sheet metal and electrical purposes, but have found slow acceptance by those same entities for mechanical systems.

Wire hangers were thought to not be strong enough to handle the added weight of mechanical and plumbing systems or provide enough rigidity. Through testing and empirical evidence, wire hanger system manufacturers/designers are pushing back on those assumptions and are beginning to be approved for mechanical systems.

What is the difference between wire hangers and standard threaded rod hangers?

Both systems serve the same purpose – to elevate and hold plumbing and mechanical systems when systems are fully charged. That means they need to reliably hold a lot of weight and also protect the structure of the systems, and the safety of those below them.

Process Comparison

Standard Threaded Rod Hanger System:

- Needs to be drawn and coordinated with VDC tools.
- Typically cut, assembled and organized in fabrication shops using chop saws or threaded rod cutters.
- Has a variety of components screwed into one end of the threaded rod.
- Organized on hanger racks and transported to jobsites from fabrication shops.
- Connects to concrete decks through anchors or fasteners.
- Usually designed long and cut again in the field to account for deck deflection in order to achieve the exact height.

Wire Hangers

- Can be drawn and coordinated with VDC tools with less effort. Only need install height and spacing.
- Limited fabrication shop assembly.
- Delivered to the job site with extra wire length and attached to a universal attachment.
- Attached to either a concrete deck using similar anchors and fasteners or looped around structural beams.
- Raised up and cut with wire cutting hand tools.
- Extra length is left on the wire to allow for future servicing or maintenance.

Suspension wire hangers can be an essential component in ensuring that installed systems remain stable, properly aligned and secure over time. These hangers are commonly used to suspend pipes, conduit, and ductwork from ceilings or structural beams. Suspension wire hangers more easily allow for adjustments in height and alignment with little to no fabrication time required.

When contractors need to decide which system to use on a project and why, there are two critical factors:

- Labor: How easy and convenient is it to produce and install *Hanger System A* over *Hanger System B*?
- Material cost: How does using suspension wire hangers compare with other traditional options from the standpoint of cost-effectiveness?

Application of Suspension Wire Hangers

Suspension wire hangers are increasingly being utilized for a wide range of construction applications due to their versatility and strength. Contractors have implemented these hangers to support various types of equipment and systems, including fan coils, refrigerant racks, small bore plumbing services, domestic water lines, ductwork (both spiral and rectangular medium pressure and low pressure), as well as PVC, copper, and CPVC pipes. These systems are particularly prevalent in waste, vent, domestic water, and hydronic applications, handling sizes up to 10" lines containing vapor or fluids.

One key advantage of suspension wire hangers lies in the simplicity of the required tools. The installation process generally requires only basic hand tools, such as standard wire cutters, toggles, cable cutters, and wire tensioners, often supplied by the hanger manufacturer. These tools are not only inexpensive but also easy to use, minimizing the need for significant investments in specialized equipment. This ease of use facilitates a smoother transition to wire hangers, making them a viable option for many contractors.

Production Process for Hangers

Traditional hanger production is a labor-intensive process that involves multiple stages of coordination and fabrication. In a typical setup, hanger requirements are coordinated through a Virtual Design and Construction (VDC) process in which all pipes, hangers, and attachments are meticulously drawn using specialized software. The software helps sort items by area, after which hangers are cut to the required length using automated equipment like a TigerSaw. Each piece is then labeled, organized, and assembled in the shop before being dispatched to the job site. This entire process can take approximately 15 to 20 minutes per hanger, including the VDC time, ensuring that the hangers are ready for immediate installation upon arrival.

The production process for suspension wire hangers is significantly more efficient. These hangers often bypass entirely the need for in-house fabrication. Instead, they are purchased pre-cut from the manufacturer, eliminating the need for detailed shop drawings or lengthy fabrication processes. In some cases, minor adjustments, such as attaching a clevis hanger, can be completed in less than a minute within the shop. The result is a dramatic reduction in labor costs, with estimates indicating that labor for suspension wire hangers accounts for only about 5% of the total piping labor costs—significantly less than the 30% typically associated with threaded rod hangers.

Installation Time for Hangers

The installation of traditional threaded rod hangers is a time-consuming process, often requiring precise measurements and on-site adjustments. Typically, the installation of each hanger takes from 5 to 10 minutes. However, when including setup, transportation, and final adjustments, the total time can extend to 25 to 30 minutes per hanger. This process becomes even more complex in scenarios where the concrete ceiling deflects, necessitating additional cuts and adjustments on-site to ensure proper alignment and stability.

By contrast, suspension wire hangers significantly streamline the installation process. Installation generally involves running the wire through upper and lower connection points and locking it in place, with installation times remaining similar to traditional methods, at around 5 to 10 minutes per hanger. Importantly, the overall project time is reduced due to the elimination of extensive on-site fabrication and adjustment tasks. For example, one case study highlighted that using suspension wire hangers reduced total production and installation time from 950 hours for traditional hangers to just 500 hours, showcasing a significant time savings despite a slight learning curve associated with the new system.

Acceptance in the Construction Industry

The construction industry's acceptance of suspension wire hangers has been mixed, though generally positive. Contractors have reported no significant barriers to gaining approval from engineers, owners, general contractors, or inspectors. The flexibility of the system, combined with existing third-party engineering approvals, has facilitated acceptance of suspension wire hangers on a variety of projects.

There has been some resistance, particularly from architects and engineers who are hesitant to deviate from traditional specifications that do not include suspension wire hangers. This resistance is typically not due to code compliance issues but rather due to entrenched design standards. Additionally, in markets such as data centers, structural engineers often prefer all services to be suspended from structural steel framing rather than composite decks. This preference can limit the use of wire hangers in those specific applications.

Despite these challenges, the overall trend indicates a growing acceptance of suspension wire hangers, particularly in projects where traditional hanger installations are more challenging or less efficient.

Advantages of Suspension Wire Hangers

Suspension wire hangers offer numerous advantages over traditional threaded rod hangers. One of the most significant benefits is their flexibility during installation. Unlike traditional hangers that often require precise alignment and measurements, suspension wire hangers can be easily adjusted post-installation. This feature is particularly advantageous for trades such as insulation, where adjustments can be made without the need for reworking hanger lengths or dealing with blocking for insulation. The system's adjustability simplifies the installation process and reduces labor time both in the fabrication shop and the field.

Additionally, suspension wire hangers contribute to on-site efficiency by reducing the number of parts required and simplifying logistics. The reduced labor time and streamlined process not only lead to cost savings, but also enhance safety and manageability on the job site. Contractors have reported significant labor savings, especially when dealing with large, fabricated, pre-insulated assemblies, where installation is simpler and safer compared to traditional methods.

Recommendations for Future Integration

To further leverage the benefits of suspension wire hangers, mechanical contractors should consider the following recommendations:

- **Expand Integration:** Look for opportunities to integrate suspension wire hangers more extensively into specific projects, especially those where traditional hanger drawing and fabrication processes are less critical. Pre-coordinated jobs and projects with challenging installation conditions could benefit significantly from this method.
- **Promote Acceptance:** Increase efforts to educate stakeholders, including engineers, architects, and owners, on the advantages of suspension wire hangers. Highlighting their flexibility, efficiency, and potential for labor savings could help overcome resistance and promote broader acceptance within the industry.
- **Explore Applications:** Continue to explore the use of suspension wire hangers across different services, recognizing their versatility in various construction scenarios. Encouraging innovation in the application of wire hangers could unlock additional benefits and efficiencies.
- **Address Challenges:** Work proactively to address challenges related to gaining approval for larger services, particularly from engineers and other stakeholders.

who may be unfamiliar with the system. Providing clear evidence of the system's effectiveness and compliance with engineering standards will be key to overcoming these obstacles.

- **Enhance Product Offerings:** Encourage product manufacturers to improve the implementation of suspension wire hangers by offering products with pre-attached hangers on universal mounts. This would further reduce the need for in-house fabrication and enhance the overall efficiency of the installation process.

Conclusion

The transition from traditional threaded rod hangers to steel wire suspension hangers represents a significant opportunity for plumbing and mechanical contractors to optimize their workflows and improve project outcomes. By adopting suspension wire hangers, contractors can reduce labor costs, enhance flexibility, and streamline project timelines, leading to more efficient and cost-effective construction practices. The insights gained from industry professionals underscore the importance of embracing innovative solutions like suspension wire hangers to stay competitive and achieve better results in an ever-evolving industry.

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Before exploring the use of wire hangers in your market, please verify their acceptance and compliance with local codes and perform your own business analysis for feasibility and process. Also, verify ratings for all projects and correct installation methods before specifying and installing new products.

The JRGF also acknowledges and thanks Stanley Black & Decker for their financial contributions to the study. Their assistance has helped bring to your attention the topics that can and will have an impact on your company's operations and ongoing success. Helping to meet your needs through our case studies and research is a key objective of all our efforts.