

Misinterpreting miscellaneous metal methods makes for a problematic project. But enhanced expectations, communication and coordination can create construction clarity.

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MISCELLANEOUS METALS – THE DEVIL IS IN THE DETAILS, PART II: VUCA PREVAILS

BY TED HAZLEDINE

EVER HEARD OF VUCA?

The acronym, whose origins are in the military, stands for volatility, uncertainty, complexity and ambiguity. It can be applied to a vast range of organizations, processes and industries, including construction.

No element of the construction process is more emblematic of VUCA than miscellaneous metals (keep in mind that I say this as the president of a fabrication shop that specializes in miscellaneous metals). There are several culprits that fuel VUCA in the miscellaneous metals world—and the steel construction world in general—but luckily there are also ways to address them.

Design Deficiencies

In my opinion no element of the construction industry has created more confusion than design deficiencies, both in plans and specifications. This is largely caused by slow decision making and late changes by owners and architects, and their demands of engineers to reduce fees and maintain already-short schedules. The combination of inadequate budget and time constraints does not allow sufficient attention to details or proper coordination with the other project design professionals—thus creating ambiguity and uncertainty. The fabricator assumes considerable risk when making decisions affecting the bid price. Constructability very often becomes a central issue since method and means are the responsibility of the contractor team. Ultimately, it is all too often the case that design work gets pushed down the line to keep the project moving.

Connection designs are a common example, but all of this also affects the miscellaneous metals segment of the industry. For example, fabricators are now called upon to employ or retain an engineer to provide signed and sealed designs for stairs to fill a stairwell shown on design documents. Often the design intent is not indicated at all or is called out in specifications. This design service is not free and must be added to the bid price. Other examples include the specification of catwalks, lintels, mechanical supports and railings in a similar manner. Recently we encountered a project specification that required the steel contractor to determine and account for the thermal expansion of a lintel and the supporting masonry! (It was excluded from our proposal.)

The coordination of design intent between architectural and structural details can be even more problematic. Very often it

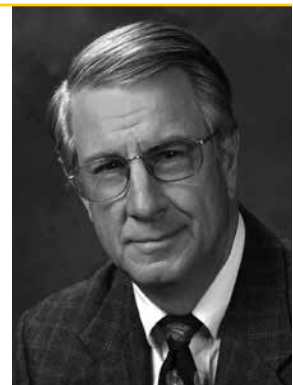
is apparent that there was little or no discussion regarding elements of canopies, overhangs or mansards. The details are very different, with huge consequences to the final risk and price.

Low Price Mentality

It is well known but should be constantly reinforced that a low bid price does not always result in the low final cost. Unfortunately there is often a lack of understanding of the design and construction process, and the “low price” mentality actually leads to many change orders and related conflicts—and eventually higher costs. This is often coupled with a lack of knowledge of what constitutes a good design and a misunderstanding of what constitutes adequate construction documents. Owners and architects tend to rely on the engineers, whom they have hamstrung with low fees. Years ago architects were considered the “master builder” and were adequately compensated for and expected to provide reasonably detailed documents in a coordinated manner, on which fair pricing and subsequent construction could proceed. But the increasing complexity of our industry and the forces demanding lower design fees have combined to increase the ambiguity of the resultant construction documents, thus increasing the risks of the construction team.

Another reality also weighs in here: Bid proposals from miscellaneous metals contractors are generally provided in the last minutes before general contractor bids are due (an unfortunate outgrowth of “bid-shopping” by contractors), and there is seldom adequate time to evaluate the bid and scope of work, thus

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increasing the risk of the contractor who uses the “low bid.”

The scope of work that makes up the fabricator’s bid can be very complex and confusing. The list of items included can be several pages depending on the project magnitude, often referring to specific architectural and structural design details that will eventually need clarity before they can be built—and the list of exclusions is as important as the list of inclusions. Most of these issues can be traced to inadequate and ambiguous details created by design professionals who were hired on the basis of low bid and were not able to develop more concise documents.

Adding to the complexity, miscellaneous metals contractors often bring problems on themselves by also allowing the “low price” mentality to prevail in their fabrication and erection procedures. The simple fact of the matter is that a product will not be fabricated properly if it is not drawn correctly. Shop drawings are the last line of defense and the detailing work, whether in-house or outsourced, must be done correctly as well as efficiently. This requires adequate time to interpret a less-than-adequate construction document. If the detailer has been “beat down” on pricing, the resulting drawings may be deficient. Sometimes you find this out in the fabrication shop, which is fortunate but costly. Other times the errors are not discovered until the product is being erected; we all know how expensive that can be. And back-charging the detailer is usually out of the question, since the huge costs associated with field fixes usually dwarf the detailing budget.

The same low price approach to the various suppliers of specialty products and services—such as non-ferrous metal handrails,

galvanizing, blasting and painting, wire mesh partitions, gates and others—can lead to serious quality issues. VUCA is at work!

Enhanced Expectations

So how can we deal with the VUCA factor of the construction industry as it relates to miscellaneous metals and other steel team players? There are many opportunities to establish procedures that can mitigate, and in some cases eliminate, the risk factors that can lead to costly remediation of problems created by ourselves or others. Following are some recommendations that will likely help.

Choose the correct customers and suppliers. You must establish expectations that reflect your company philosophy in all areas. Expect attention to detail, prompt response to inquiries, RFIs, etc. Expect quality and timely deliveries to your shop or the field. Expect proper attention to payment terms and billing procedures. Expect teamwork with everybody pulling in the same direction. Do you do what’s best for the project or what’s easiest or quickest, with little regard for the downstream consequences? Choose customers and suppliers with good field, plant and administrative leadership. They are part of your team. Doesn’t it make sense that they should be good at what they do?

Request a pre-job conference. Do so as early as possible following receipt of authorization to proceed. It’s amazing how enlightening it can be to discover and resolve conflicts or misunderstandings regarding scope of work, interpretation of documents, delivery requirements, coordination of crafts and prod-

Photos: Benchmark Fabricated Steel



▲ Architecturally exposed structural steel for the canopy of an Indiana State University building.



▲ An architectural metal handrail at a Rose-Hulman Institute of Technology—a typical miscellaneous metals project involving field measuring of steps following the concrete pour.



▲ Architectural structural columns at the Union Hospital Bone and Joint Center. (All three of these miscellaneous metals examples were fabricated by Benchmark and are located in Terre Haute, Ind.)

ucts, contract terms, payment schedules, interfacing with other team members, etc. What exactly does your customer think he's buying and what exactly do you intend to furnish? And when?

Stick to your shop drawing plan. What are the expectations of shop drawing guidelines, schedule, review time and approval? Erection drawings should be submitted as early as possible to allow for field dimensions, RFIs, clarifications and other issues that are impacted by a miscellaneous metals package. Stipulate that full shop details will be developed only after proper and meaningful answers to questions and proper field dimensions are resolved. Avoid redundancy in the detailing process. We are already challenged to meet detailing budgets with ongoing document deficiencies.

Develop and implement an action item list. Be proactive in the communication process and initiate an action item list. This will assist the construction team in establishing timelines, statements of issues, needed response time and the responsible party for particular action or information. Publish and review the list regularly, and communicate it to all construction team members. This is particularly important for RFIs or statements of field conditions that may need to be mitigated. Of course, design decisions or interpretation are ongoing issues that require prompt and substantive response.

In addition, be proactive and offer practical solutions when requesting clarification or information. Design professionals and contractors appreciate the insight, and it will get the dialogue cooking over an issue. Always do what's best for the project, not necessarily what's easiest or quickest. Your credibility will increase.

Embrace QA/QC programs. While the AISC *Code of Standard Practice* is not intended to apply to the product group known as miscellaneous metals (see CSP Section 2.2 and commentary), it can certainly be referenced as a guideline to establish specific, applicable standards that are not addressed elsewhere in your miscellaneous metals contracts. In addition, the procedures and programs of the AISC Certification Program can be helpful in establishing a quality standard that will make a fabrication shop more consistently productive and reach a higher level of quality.

Pay attention to details. I was fortunate early in my career to encounter a construction superintendent for a very large firm who told me in no uncertain terms, "The big stuff has a tendency to take care of itself due to the enormity, potential impact and number of people involved—but if you pay proper attention to the details, you will be successful."

Establish ground rules for change orders. Most design professionals understand the difficult situations that arise from deficient details and understand that the construction team is their ally in bringing the project to a successful conclusion. Unfortunately owners often either do not understand the difficulties and extra expenses brought on by deficient or conflicting details, or they flatly state that no change orders will be accepted. This is very often the case in public projects where budget-challenged agencies, schools and governmental units, for example, have limited resources. This is another reason for picking your projects properly. Do your due diligence. In times where public work is the only game in town, the pre-job conference where these issues can be put on the table becomes very important. The action item

list can be very helpful in establishing the timelines and anticipating issues. Be sure that your erector has work order change procedures and the general contractor's personnel know that you expect to be paid if warranted. Negotiations and discussions are enhanced by proper documentation.

Be an important member of the team. Be the go-to person on your team when issues arise that relate to your specialty and materials. Regular communication between detailers, architects, engineers, all project contractors and owners will reveal deficiencies early in the game before expensive field labor and equipment run up huge costs. Don't limit your review to only your product or service. As a miscellaneous metals contractor, we often touch virtually every part of the project to some extent, so we are in a position to see issues on paper early in the process. This requires considerable insight and foresight, not to mention time and knowledge. Isn't it cheaper to make this effort in advance rather than fight for a change order after you've spent the money? I have encountered only a few design professionals that don't appreciate this capability. They know how it works.

Do your homework. Many of the above issues are often addressed in the specifications or proposal request. Contract language is very important particularly where the miscellaneous contractor is bound by the general contractor/owner contract. If you don't exclude onerous provisions in your proposal, you're stuck with them in most cases. Do your best to have your work proposal incorporated by reference in your contract.

Payment terms should be discussed. The procedure for downstream flow of cash should be made abundantly clear to all parties including forms to be used. If you're responsible for your customer's accounts receivable, which is the *de facto* result of payment clauses, then you have a right to know where the money is and when you will see it.

Enjoy yourself! Have fun doing your job. Try to pick customers and suppliers that accept the challenges straight on and enjoy their work. This business is tough enough without dealing with a bunch of malcontents whose sole purpose in life is to make your life miserable because they're not happy for whatever reason or, worse yet, they want to transfer money from your pocket to theirs.

Ever-Elusive Perfection

Perfect construction documents simply do not exist. There will always be some level of volatility, uncertainty, complexity and ambiguity. Even when adequately compensated the design team simply cannot create drawings that address every single issue. That's the job of shop drawings, other document submittals and subsequent review and discussions. The construction team should come together under the direction of the general contractor or construction manager to bring all the pretty pictures to life. The power and synergy of a team of dedicated construction professionals can be incredible, but only if there is mutual trust, respect and understanding of the construction process. **MSC**

Read Miscellaneous Metals: The Devil is in the Details (Part I) in the February 2009 issue of MSC, available at www.modernsteel.com.