MIDWEST DESIGN GROUP

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Question:

Economic risks such as increased inflation rates, material availability, labor shortages, and mass resignations are increasingly affecting the design and construction industry. Describe how these issues have affected you and your firm and what measures have been taken to manage these risks. Have you made any changes to how you have traditionally done work? What additional challenges do you see emerging from larger market trends and how would you address them?

Response:

I hear yelling coming from across the hall in my office, it's my business partner having a "calm" conversation with a general contractor about increase in our contract price because metal stud pricing has increased 20% since the bid was sent out over two months prior. This is a once-a-week scenario in our office that has three departments working a range of the construction industry, we provide structural engineering services, Interior finishes, and Owners Representation work from a single firm. This has put our company and I in a unique position to be able to see the full aspect of a project, from cradle to grave. It has also made me as a structural engineer more aware of how timelines and deadlines can cause major changes for a project on the cost and schedule side. The biggest challenge on our engineering services will be timeline changes from more traditional schedules because of these highly volatile pricing of commodities such as steel plate, metal stud and concrete even. Our business strategy as a company has been to focus on large industrial warehouses, this means we are mostly working on projects that are five hundred thousand plus square feet. Working on these size of projects causes small changes in prices or weight of steel to increase the project budget significantly. This issue has been the biggest challenge we have faced as an engineering department because this causes contractors needing drawings as soon as possible to be able to get the lowest price locked in on the contract. We have projects of one million plus square feet of steel framing that is required to be turned around in a single day. This hurdle has cause us to need to be versatile in our deliveries and how we have moved to respond to this is to utilize Revit instead of AutoCAD to be able to automate some aspects of the drafting processes to decrease the production time on our end to be able to meet these tight deadlines. Outside of the engineering department our construction and interior finish side of the business which focus on metal stud framing, drywall and painting has been hit a bit harder with the inflated rates and material shortages. These both have caused us to need to start ordering materials up to six months before a project construction has started, this causes a lot of headaches from storage to payments and invoicing. The storage aspect is a bit unique with how we need to coordinate with our contractors to leave materials on job sites for months and having some security to not allow the material to grow legs and walk off the jobs site. Also, the financial side of being a relatively young growing company to be required to buy in some cases millions of dollars in materials when our contract is laid out to be paid when the contractor is paid which typically occurs after construction has started, this has required us to be versatile in our contract writing and having direct communication with our general contractor to be transparent on when we need to be paid sooner due to these earlier material orders. This has also brought a unique connection between our engineering department and interior finish team too by trying to reduce interior non-load bearing wall sections to minimize the cost on jobs. One of the large changes we have been digging into has been to better understand these wall section by bringing our engineering department into these jobs prior to bidding to help the construction team and even owner to help reduce the cost on a project. This is much more unique to me in my history of structural engineering to have such a deep dive into items that are not your typical structural items on a job but with how inflation and material timeless going straight up in the last three plus years has caused more people to start thinking on there feet to adapt and find saving in areas that was not thought of in the past.

With everything changing so fast though this has also put the structural engineering field into a tight corner because prices on these commodities are so high to reduce, reduce, and reduce. This need for tightening budget and even tightening timelines make contractors try to pressure structural engineers to design buildings with lower redundancy and question the conservativeness of the design. In some respects, I love this because growing in this industry from early on I always questioned my design on how I can make it cheaper. This idea was ingrained into my mind from an early age of working construction in my teen years with my father to working for the fifth largest construction company in the United States in Kiewit during my college years. However, I think with these times being so volatile on the price side has caused some contractors to try to pressure engineers into being tighter on our numbers or requiring the engineering field to justify every situation of design. This is one of the largest hurdles I have had to deal with and being a younger engineer being questioned even more on my design. I have had to spend countless hours verifying my design and pushing as much capacity out of my design as possible without putting clients and society in an unsafe position of having buildings that are not adequately designed for all aspects of the

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building's life. The biggest measure I have taken is to learn as much about these designs as possible and understand the full aspect of the building or element being designed to fully incorporate a safe, well-built building but also control cost on these projects. This comes up most in our design of Precast and Tilt-wall buildings, where details and panel design are critical aspects that can change in large magnitudes based on small changes in assumptions on how these will be constructed. We work directly with precast manufacturers and tilt wall contractors to better understand the system they are building to finesse the fine points of the design to maximize the capacities of these products. In one example is the construction of precast prestress wall panels and the ever-changing science of composite action in these panels. This is an evolving space with new testing and new materials coming out every year and has a large design change to these panels in both increasing and decreasing the capacity of these panels. This has been one way I believe our firm has stuck out to these manufacturers at fine toning these aspects to get the most out of the prestressing strand and concrete panels to minimize their cost and maximize the true capacity of these panels.

In the ever-changing world the number one take from our firm and myself is to be flexible. This is critical in these times of a wacky world of inflated prices, material shortages and even labor shortages and helps our firm stick out from the competition. I believe the knowledge we are learning now will change the industry for good and make buildings more economical when the economy starts to settle down in the next few years and for decades to come. It is a great time to be in the structural engineering field and exiting time to be working in construction field period.