

A photograph of three men standing in a construction or industrial setting. They are positioned around a large, complex metal structure that appears to be a testing rig or a piece of heavy machinery. The man on the left is wearing a light-colored polo shirt and jeans. The man in the middle is wearing a white tank top, a baseball cap, and jeans. The man on the right is wearing a white t-shirt and jeans. The background shows a concrete structure with various pipes and beams.

TED CARLSON

STRUCTURAL DYNAMICS

LEFT TO RIGHT, TED CARLSON WITH FOREMEN LARRY DUNSETH AND JIM HORN

Somewhere a house is sinking, a floor joist is about to give in, and a cabin with a spectacular view is ever so slowly slipping into the lake. These imminent disasters might sound like jobs for Superman, but what they really call for is a structural engineer. Ted Carlson may not have x-ray vision, but he can still spot some scary problems that most of us would miss. When called for, he can also come to the rescue.

All engineers are problem solvers. For structural engineers like Carlson, the basic problem is gravity. Whatever human beings erect will invariably want to fall down in time. Factor in human error and carelessness or assaults from tornados and earthquakes and it's a wonder anything we build survives for long. This shaky state of affairs is the solid foundation of Carlson's company, Structural Dynamics, Inc.

Structural Dynamics is a unique firm in the region. Although there are plenty of building contractors in the area, only Structural Dynamics, with its in-house engineering expertise, can handle the inspection, design, and execution of complex stabilization projects. Ted describes a typical scenario: A homeowner sees a crack in his foundation and fears a settlement problem. He calls a couple of piercing contractors, who send out salesmen to look at the house. They shoot some elevations and predictably recommend very costly fixes. A licensed structural engineer approaches the problem quite differently.

"A homeowner calls me in to do an inspection," Carlson says, "and I can assess the whole building in context. It's a time-dependent function. One inch of settlement in a week is a problem; one inch in 20 years is not a big deal."

The expertise to evaluate a structural problem and propose cost-effective solutions comes from both rigorous formal education and a lifetime of curiosity. A graduate of Southern Illinois University, Carlson's practical

training in problem solving began long before college. "When I was growing up, I built tree forts in the woods and played with Legos," he recalls, "but that was in the days before they came packaged in kits with instructions. I was always figuring out how things work."

But what really distinguishes Structural Dynamics is a comprehensive business model that arose from



TED STARTED HIS ENGINEERING CAREER AS A BUILDER OF TREE FORTS. THIS SHOT IS FROM A LOCAL PUBLICATION THAT FEATURED A STORY ON HIS TALENTS.

Carlson's entrepreneurial instincts. "I was working at an engineering company in Glenview," Carlson explains, "and I started bidding some of the projects that the firm had designed repairs for. I'd do the jobs with my friends on the weekends and pretty soon it started getting to be the weekends plus a couple of days during the week. Finally I ended up going out on my own." Today, Carlson still does the engineering and design work and supervises the construction side.

MANY OF THE PARTS USED BY STRUCTURAL DYNAMICS ARE FABRICATED IN HOUSE.



The economy is a big variable in Carlson's business, of course, and he's had to stay flexible to meet recent challenges. When the value of real estate crashes, people have trouble justifying the expense of foundation replacement, especially when the house next door is for sale at the same cost as the repairs alone. On the other hand, he has found that the inspection side of his business remains strong in this precarious economic environment.

At the height of the building boom, houses were going up very quickly, some of them too quickly. Today Carlson is seeing damage in very new homes that are literally sinking into the earth. While most developers are conscientious, a few don't spend the time or money to test or properly prepare the soil before building. Carlson explains, "The hard clays below the topsoil in this area are very stable, but if there's a layer of peat underneath, or a layer of improperly compacted fill material, the building will eventually sink into it. You can't tell it's there without soil borings." One of the worst cases of this type of damage that Carlson can recall was a 5-year-

old home in Aurora that was more than 9 inches out of level. Stabilizing buildings with these sorts of issues calls for driving steel piles into the ground, attaching them to the foundation walls with brackets, and then lifting the entire building, along with its foundation, back to a level position. The systems required for such a job must often be custom designed and fabricated by Carlson and his crew.

Some problems arise simply because homeowners don't think like engineers. A good deal of what can go wrong in a building is caused by error or ignorance. "I've been in attics where people wanted to create more storage space," Carlson says, "so they cut out all the diagonal members of the roof truss. We have to go in and rebuild it. It's a mess." In another instance, Carlson got a call from a man who couldn't understand why his floors were sagging. "When I got there," he remembers, "I found basically a library in his house; books were stacked from floor to ceiling, row after row. The joists were cracked and the floor was ready to cave right in. It was a real emergency situation."

THROUGH THICK AND THIN

Then there are the cases that fall outside of anyone's control: tornados, floods, fires, and earthquakes. In northern Illinois, the most common cause of structural damage is wind and water. The last two Novembers have seen considerable wind damage in the Belvidere and Caledonia areas. Carlson goes into tornado-damaged homes to determine whether they are safe for occupation. Some are obviously total losses, but in other cases the damage is subtler, and determining the building's condition is a tricky business that takes knowledge and considerable experience. "Sometimes you walk into a house that looks fairly intact on the outside and find inside that the whole thing is racked, diagonal cracks over the doorways and every wall out of plumb. It's almost impossible to pull that back."

He said, "almost impossible," of course, because that's how engineers talk. While some properties are indeed not worth the expense required to save them, if he can offer a cost-effective fix, Structural Dynamics will "give it a shot," Carlson says. Sometimes that means designing and fabricating the best tools for the job yourself. Carlson's patented jacking systems are built in his own shop. "The technology of driving a steel pile into the ground to support a building has been around for a long time," Carlson explains, "but I've done what I feel are improvements to the whole system."

Computer technology has also dramatically enhanced the efficiency and productivity of not only Carlson's business but the entire industry. Programs like AutoCAD offer great advantages for drafting, and structural design software exploits the extraordinary calculation speed of computers. For example, 15 years ago, Carlson says, designing a reinforced concrete cantilevered retaining wall for a 15-foot drop would have taken two or three days. "Now I can draw up and compare several different designs in a couple of hours. I feed in materials, dimensions, and loads, and the program calculates everything in a split second. The software allows me to work so much faster that I can look at many more alternatives for any job." That allows him to be both creative and competitive.

The work of Structural Dynamics is usually hard to see with the untrained eye. In fact, most of the work Structural Dynamics does gets buried . . . literally. But that doesn't bother Ted Carlson very much. His satisfaction is in solving the problems that keep the rest of us awake at night.

"I started banking with Resource 16 years ago and they have stood by me through thick and thin, and to be honest, some years it was pretty thin. Kevin McArtor, my client advisor, is knowledgeable and professional and always has good advice to offer—on everything from structuring a line of credit to financing equipment. He's a pleasure to work with."

Ted Carlson,
Structural Dynamics, Inc.
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SOME PILINGS ARE AUGERED INTO THE GROUND LIKE CORKSCREWS.