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Borders Roof Collapse: Are Others Looming Out There? by Robert A. Chagnon, P.E.

EDITOR'S NOTE:

We have asked for and received permission to reprint this article and have done so because it provides a striking example that involves no one in our industry but certainly could. We certainly can learn from this by considering the following questions:

- As an industry why have we spent so much time and sizable resources on quality control and technical training?
- How does our work in these two areas tie into the way our industry handles design and manufacturing?
- What value do these programs provide to the tie between design and manufacturing?
- Will we get a solid return on our investment if we implement these programs fully, as companies and as an industry?

We would enjoy hearing any thoughts on these questions and the following article. Please email your thoughts to us at editor@sbcmag.info.

EVENT

Many of you will recall the collapse of the Borders Book Store in Newark, Delaware, during a severe winter storm in January of 1996. You may have forgotten about this event, but D.A.P.E.'s [Delaware Association of Professional Engineers] Law Enforcement and Ethics Committee hasn't. It has been referred to as Case No. 96/099 ever since and it's been pursued relentlessly thereon.

Inasmuch as the engineers involved were from the State of Ohio, and not registered in the state of Delaware, the Delaware Association of Professional Engineers had no jurisdiction over them. However, the D.A.P.E. Council did write to the Ohio Board requesting that they instigate a disciplinary investigation for practicing engineering in the state of Delaware without a license, in addition to alerting all other Boards in the United States of the unlicensed practice of the Ohio engineers and their firm.

FOLLOW-UP

Throughout the past five years, D.A.P.E.'s Law Enforcement and Ethics Committee has, with assistance from our Attorney General's Office, kept close tabs on the legal proceedings of this case as it progressed through our court system. It was relentlessly committed to doing so in the

event that conclusions were reached which would indicate that one or more of our laws, governing the practice of engineering in the state of Delaware, were violated; thus, placing the health and safety of our general public in jeopardy.

BOTTOM LINE

It might interest many of you to know what actually caused the collapse of the Borders roof. Simply stated, it appears that undisputed evidence was produced which indicated that the open web bar joists involved in the collapse had been poorly manufactured and the defective welds involved simply failed to sustain the loads transmitted thereon. As is generally the case with such issues, several other related occurrences exacerbated the failure, including the misplacement of an HVAC unit thereon and the failure of those recognizing this fact to follow the proper chain of command in alerting those who could have taken the appropriate action needed to avert this disaster. However, expert testimony did validate that the defectively manufactured joists could have adequately sustained the weight of both the HVAC unit and the snow and ice involved had the joist welds been properly executed.

SO WHAT?

As a structural engineer in private practice for over 25 years, I can earnestly tell you that the manufacturer of the joists involved is an extremely popular supplier of open web bar joists in the state of Delaware. I am certain that I personally have checked and signed-off on many shop drawings featuring their joists over the years and am now seriously concerned as to how many of the buildings for which I've designed structural systems contain such defective joists. And I would think that you should be also. I am equally concerned by the fact that the Standard Joists Institute (SJI), the agency that regulates the design and quality control of open web bar joists, was not a party to any of the lawsuits involved in this case. Why not? Am I now to suspect that the system is faulty and joists manufactured by others could also contain defective welds?

WHAT TO DO

To be perfectly honest with you, I don't know. However, here are some thoughts I've had on reducing the possibility of such occurrences repeating themselves most every bad winter that comes our way:

- Organize a panel discussion made up of representatives from the bar joist manufacturer and supplier involved, along with the expert witnesses that participated in the case, with the objective of educating our consulting community as to what actually happened and how to prevent it.
- Get some of our local consulting engineering societies to hold a combined meeting with the local chapters of the American Society of Mechanical Engineers (ASME) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHREA) to focus on the susceptibility of applying loads to open web bar joists, other than the uniformly distributed loads that they were sized for, and factors to consider in placing roof top mechanical units on roof structural systems.
- Get a representative from one of our professional liability insurance firms to sponsor a

workshop on avoiding such events through special inspections and/or other recommended precautions.

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