New Seismic Moment Frame Joint

The article in the July *Modern Steel Construction* about the new moment frame joint developed by Mark Sarkisian of SOM was very interesting. However, there were two points in the article that were misleading and perhaps confusing to readers. The article says that, "When the earthquake is over, the Pin-Fuse Joints return to their usual positions, with the torque in the bolts maintained."

There is no mention in the article that the joint has any restoring force mechanism. If there is none, the joint will remain distorted at the angle at which it was at the time the seismic forces got small enough to be unable to slip the bolts. Additionally, it is unclear why builders could "rely on smaller frame members than otherwise would be required to withstand an extreme seismic event" since moment frame member sizing is invariably governed by stiffness (building drift) considerations which would ostensibly be only slightly changed by this joint. Notwithstanding these comments, it is an interesting invention that would appear to make post-earthquake repair simpler than for conventional joints.

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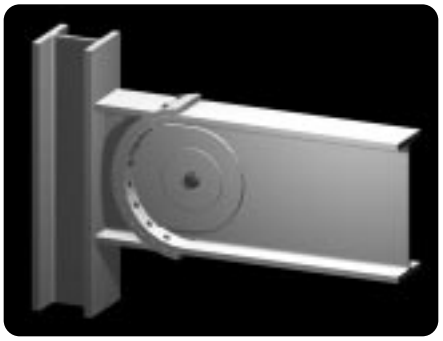
The following is a response to Mr. Saunders's comments:

The restoring force mechanism of the Pin-Fuse Joint relates directly to the overall behavior of the frame. The beams and columns are designed to remain essentially elastic, with the Pin-Fuse Joint controlling joint



slip to tolerable limits. Some beam-to-column joints within the frame may be designed without the fused joint so they can provide an elastic restoring force to return the frame to its original pre-seismic position. Moreover, as not all of the Pin-Fuse Joints are likely to slip during a seismic event, they will provide additional restoring stiffness. If under some conditions the frame does not complete re-align, it would be possible to loosen the bolts at any critical connections locked in an off-center position allowing the frame to re-position itself.

Stiffness (building drift) of the frame certainly may control final member sizing. However, using a performance-based design approach, the overall ductility and deformation demands of the system will be confirmed with studies compared to current code requirements. The expectation is that increased (and more reliable) joint ductility will lead to reduced structural demands and smaller member sizes.

Studies are presently underway to investigate both of these important design considerations. Thank you for your thoughtful comments.

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