Shower Enclosure Rationale for Code Development

This is a response to a building official who felt that this should not be a code requirement.

Mr. Building Official,

Thank you for your response to my article on shower enclosures.

I recognize the two Sections in the UBC and IBC referring to four side glazing support. The frameless shower designs do not have four sided support and they are rarely designed by a structural engineer.

The problem is evolutionary. Until 15 years ago, all shower enclosures (except tub enclosures) were framed glass units. This posed little problem for the installing glazing contractor because the manufacturer had complete control over any design specifications that exceeded there recommendations.

The situation today is quite different with the advent of the frameless units. Most frameless shower enclosure manufacturers produce the hardware; pivots, hinges, handles, towel bars, mounting brackets, channels, headers, and posts. Very few produce the tempered glass. For the 50% of complete units (including glass) furnished by the enclosure manufacturer from the design measurements by the glazing contractor, they control safety limitations over panel sizes. However, the other 50% of the units installed are through the glazier's purchasing the hardware only from independent manufacturers of hardware. This saves the installer the additional mark-up of the most expensive part of the enclosure, the tempered glass. This also, blocks the hardware manufacturer (if they care) from any knowledge of how their product is being used.

Most glazing contractors will follow the architect's or owner's design without regard to ultimate safety. Even when the glazing contractor knows from experience there will be a problem from some designs, he has no guidelines to prove his point to the owner or architect. The same goes for the architect and the building inspector.

This is where our task group came into being. It took place after numerous complaints from building inspectors who noted unacceptable deflection on load bearing panels (where the door hinges off the side panel). One jurisdiction placed a moratorium on all frameless units until we helped them with some limitations. These were subsequently adopted by all jurisdictions in that county. The initial problem stemmed from excessive deflection. This in itself was not a problem for the glass, but neither the owner nor the inspector could tolerate the awesome bending of the glass.

The Manufacturer

Our task group made up of over 32 shower enclosure manufacturers, contract glaziers, hardware manufacturers, and temperers from across the U.S. to develop the code amendments after 30 months of deliberations.

> During this period we discovered that some of the shower manufacturers actually did not produce or require performance testing on their hinges.
> Further, all of the shower enclosure manufactures produced inside towel bars.
> None of the manufacturers required the installation of anti-jumping devices for sliding units.
> Where the shower manufacturer required an intermediate hinge for heavy shower doors, there was no warning that the door could fail if the three hinges were not installed on a plumb substrate.

All of these were serious conditions that could lead to premature enclosure failure. In our proposed code, we require the hinge manufacturer to test and label hinges. The hinge rating label may not be removed until after inspection. Towel bars are prohibited on the inside of glass panels or doors. Towel bars will be used as grab bars and have caused numerous glass failures. Anti-jumping devices shall be provided with all sliding door units.

Slamming of sliding doors without anti-jumping devices has caused the door to vacate the opening with severe sequences. If three hinges are not mounted to a plumb surface, the unit is doomed to failure.

The Installer

Since (as we have already stated, 50% of glaziers buy all the parts and assemble the enclosure into the existing location, and this number is growing) the installer makes the final determination on how and what is a safe design and installation. The glazier must have safe limitations as design guidelines despite the architectural design or the owner's insistence. For instance, there are many installers that will silicone a panel to the shower surface without mechanical fasteners. This is not permitted in our code proposal since silicone alone can not sustain a permanent connection. Many architects and owners want that smooth see through look of a glass panel being "buried" into the wall, in other words, recessed through the shower wall surface. This practice has led to water penetration through the substrate into the structural framing. This practice is not permitted in our code proposal. The glazier has had no guideline to determine maximum sizes of load and non-load bearing panels and doors.

Testing

In testing the unframed tempered glass panels, there were three criteria:

1. Tolerable deflection.
2. Degradation of hinges, clips, and silicone joints.
3. Failure of the tempered glass.

Deflection of the glass is strictly a subjective condition. In general however, we found from field complaints by owners (even when the installer warned them that deflection would be greater than they could bear) that load bearing panels that deflected more than 1" from the corner, were "scary" for the user. In actual tests, we submitted repeated corner loading to pressures short of mounting degradation. The deflection was marginally tolerable by different viewers. Increasing the pressure to the point that clips, screws, and silicone separation became evident was considered failure. Increased pressure was still exerted in an effort to cause glass failure. This never happened. The clips, channels, screws, and silicone failed first.

The bottom line is that this industry needs guidelines that are subject to inspection and verification. As you can see, the glazing contractor is the true "responsible party." The hardware manufacturer must test their products and issue instructions for proper use and installation. In the end, it is the glazier who must tow the safety line. This means that our association will produce for their use a public manual explaining the limitations of unframed glass panels and not leaving the onus totally on the shoulders of the honest glazier who wants to maintain life safety.

We believe this is needed to guide designer, installer and inspector. This is not much different from Sloped Glazing when it was a run-away roof without guidelines. We made those amendments in the name of life safety.

Since 1967, I have been amending and interpreting glazing codes. There are many changes that still need to be done for clarification. This is one of the reason we have formed the Fire & Safety Glazing Council (FSGC) to aid the building code industry with honest, unbiased code amendment and development. The FSGC is so organized that no special interest can ever dominate. Our chairman is a building official. Glazing contractors, architects, testing, fire personnel, glass manufacturers, and etc. are voting members of the Council. It is not dominated by the well healed manufacturers that prevail in the standard setting groups. We subsidize the expertise that can not afford the high costs of meetings.

This can only be done with the expertise and participation of members of the building inspection industry, such as yourself.

Thank You, Donn Harter, President
Americas Glass Association