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TOUGH STEEL

WHEN I WAKE UP IN THE MORNING AND LOOK IN THE MIRROR, I'm sometimes depressed by the increasing quantity of grey in my beard (and, of course, the not-so-subtle hints about Grecian Formula from my wife don't help). Growing older, though, has afforded me an increasing perspective on the design and construction industry. In particular, the last decade has been one of rapid and exciting change.

Most obvious has been the impact of technology on both engineering and fabrication. The increased affordability and power of computers allows engineers to much more rapidly create designs and to easily play a series of "what-if" games. And a new generation of equipment has similarly increased fabricators' capabilities. But an equally impressive shift also has occurred with steel producers. Much of this change has been spurred by the growth of the mini-mills and the most obvious result of the advancement in steel-making technology has been a substantial decline in the price per ton of steel.

Less obvious are the improvements that have occurred in the steel material itself. Today, if you order ASTM A36 steel, chances are that the yield strength is closer to that of ASTM A572 Gr. 50 steel than what would have been expected a decade ago with A36. In fact, for some shapes, multi-certified steels are practically the norm, meaning you get the same steel whether a fabricator requests Gr. 50, 44 or 36.

However, with the growth of multi-certified steels, questions have arisen about whether this new generation of steel actually meets typical demands for structural shapes. These questions clearly intensified after the 1994 Northridge Earthquake and some designers asked the steel shape producers what level of notch toughness was present in the commonly produced shapes. The questions actually reached the point that some designers were willing to pay for expensive standard tests to verify this property on *each* shipment of steel. Despite the mills assurances that the current generation of wide flange shapes did indeed provide the toughness levels desired by designers, these questions persisted. As a result, AISC endeavored to study a large sampling of steel from all of the major producers. **AISC's study revealed that the values on Charpy V-Notch tests exceeded accepted levels even though toughness is not required by material or design specifications for most building projects.** An article expanding on the results of this study begins on page 38. And full copies of the study can be purchased for \$10 from AISC's Technology and Research Department by calling 312/670-5411.

Just as technology has had a positive impact on engineering practice and fabrication, it also has improved today's steel making. **SM**