HISTORY OF THE STRUCTURAL STEEL INDUSTRY

The structural steel industry is over 100 years old. During that time, steel structures and the technical specifications governing their design have become more and more complex. The **American Institute of Steel Construction (AISC)**, founded in 1921, developed the first standard ***Specification for the Design, Fabrication and Erection of Structural Steel for Buildings*** in 1923. This original document was 8 pages long. The AISC specifications have evolved through numerous versions, and the latest (ninth) edition was published in 1989. Known as ***Allowable Stress Design Specifications (ASDS)***, this document is 103 pages long. In 1986 AISC introduced the first of a new generation of specifications based on reliability theory, and this document is named ***Load and Resistance Factor Design Specification (LRFDS)***. The third edition (December 1999) of the ***LRFDS*** is 169 pages long.

Thus, in earlier days, specifications and standards used to be relatively thin documents that contained the basic essentials of a subject and were easy to assimilate and use. Growth in knowledge due to research and testing, and introduction of new steels, high strength bolts, and welding, has enabled far more complex structures to be built, and availability of computers has enabled far more rigorous analyses to be made, leading to more detailed and lengthy specifications. As correctly pointed out by Professor Hatfield [1], "Technical knowledge grows, rather than being superseded. Every generation of engineers, and of engineering graduates, is expected to know more than its predecessor.

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[1] Hatfield, F.: "Preliminary Survey of Undergraduate Instruction in Steel Design," AISC Workshop for Educators, 1992.

Meeting these expectations requires adding topics and courses rather than replacing the old with the new."

In a paper that won him the 1992 AISC T.R. Higgins Leadership Award, Professor McGuire [2] observed: "It is the nature of steel structures that all of their strength limit states--except fatigue, fracture, and tension member failure--are in fact stability limits. An engineer should have an understanding of the various manifestations of this complex phenomenon as well as the scope and limitations of the classical and contemporary schemes used for dealing with them." In effect, the strength limit states are inelastic stability limits.

Ideally, a first course in Steel Design should, therefore, be preceded by an introductory course on Stability of Structures and an introductory course on Plastic Analysis of Structures, as is the case with some European universities. As this sequence is not followed in most American universities, a textbook should include ample information about the behavior of members and structures so that the student designer understands the rationale of the design equations that he or she is using to design a structure. With the constant decrease in the number of credit hours allotted to design courses, it is not always possible to teach this in class but the material should be available in the textbook selected.

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[2]McGuire, W.: Computes and Steel Design, Engineering Journal, AISC, Chicago, IL, Vol. 29, No. 4, 1992, pp. 160-169.