Specifications

Objective specifications are generally used in design competitions, e.g., bridge design competitions. Only the relevant details of the structure are given:

- Highway live loading
- Roadway width with or without sidewalk width
- Material type
- Expected life of the structure.
- General appearance of the finished structure.
- Foundation conditions
- Number of piers allowed in a river crossing

The resulting design would be given to a committee to evaluate the "best" structure for the given conditions.

Prescriptive specifications give in great detail all aspects of the design for structures in steel, concrete or wood. Such specifications are very detailed. This may be because professors are included on code-writing committees and they are interested in having their research included in the specifications. A part of the research in the recent past that has had great impact on specifications is the inclusion of Limit States Design. The emphasis has been changed from Allowable stress Design to a failure state design now called Limit States Design. In the United States this is **called *Load and Resistance Factor Design. (LFRD)***

A close study of the standards used in most structural design in Canada design is based on the specifications issued by the Canadian Standards Association. For this course we will use CAN CSA-S16-2001. This is included as Parts 1 and 2 of the Canadian Institute of Steel Construction ***Handbook of Steel Construction (LSD)*** and with the Commentary occupies 287 pages of detailed information.

One very good reason for using prescriptive codes is that in the situation where an error has occurred in design, expert witnesses will try to show that the code has (or has not) been followed. The code prescribes minimum conditions and it is up to the designer to provide a structure that will at least meet these conditions. Should an engineer decide that for the conditions of his design that (s)/he will not meet the code requirements, this is done at some risk.

In many situations there can be clauses in the prescriptive code that may not cover a specific situation and the designer will have to refer to codes of other countries, or discuss the problem with more experienced colleagues.

Codes or standards cannot be used in isolation and a good structural engineer will require a sound theoretical background in all aspects of his profession through advanced study at a university as well as practical experience. Experience in the field, dealing with people and construction methods, or fabrication shops will all be a part of the structural engineer's education.