

Buying Steel Economically

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You can save hundreds of dollars with smart strategies for buying steel. Here's how:

Reuse parts of last year's bridge and look for scrap steel from other student projects. If your university has a salvage yard or recycling program, you may be able to get scrap from research projects. Used steel retains its original strength and stiffness unless it has been distorted, heavily stressed thousands of times, or severely corroded (surface rust is harmless).

Some scrap metal dealers sell to the public. Selection is limited but prices are low. Check your local telephone yellow pages under "Scrap Metals."

You probably won't find everything you need in scrap yards but there are ways to save money on new steel.

Steel service centers may offer lower prices than building supply and hardware stores. You can find a service center in the yellow pages under "Steel Distributors" or at the Metals Service Center Institute web site, www.ssci.org. Navigate through "About MSCSI" > "Directories" > "Member directory." Prices may vary from one service center to another so get quotations from several, if possible.

Service centers charge for cutting, so you may save by ordering full mill lengths. Order all your steel at the same time to minimize processing and delivery charges.

Service centers give big discounts to big customers. Therefore, you may get a lower price by ordering through your university's purchasing department rather than directly from the service center. A local steel fabricator may be willing to order your steel and sell it to you at cost, passing on the company's discount as a service to engineering education. The AISC web site, www.aisc.org, can direct you to fabricators. Navigate through "Find a company" > "AISC certified companies" > "Show all certified fabricators."

Steel is available in various grades which differ in properties and cost. For example, AISI 4130 tubing is stronger (higher yield and ultimate stresses) but much more expensive than ASTM A513 tubing. However, the unit weight and stiffness (modulus of elasticity) are the same. If you design your bridge to minimize the structural cost score, C_s , you will find that the stress in most members is much less than the yield limit of the less expensive grades of steel. Therefore, a bridge made primarily from those grades can be a winner. However, there is a competitive advantage to using high-strength, expensive grades for members or parts of members that are highly stressed, if there are any. Judicious use of small amounts of expensive grades may improve performance without an excessive increase in cost.

Some sizes of tubing are available in AISI 4130 but not in ASTM A513. However, you can duplicate the weight and stiffness of a 4130 tube with a built-up or milled-out A513 section.