Table 7-1. Material Selection Factors

Factor	General Requirements	Considerations
Availability	Use materials, sizes or shapes readily available.	Use supplies locally available. Concrete is used in cold weather with special precautions. Avoid use of special rolled steel shapes, which usually cost extra.
Speed of Erection	In general, savings in time will reflect savings in costs.	Precast units for repetitive work in lieu of cast-in-place concrete. Concrete systems with precast slabs and cast-in-place toppings eliminate the use of formwork. The designer should evaluate the lateral force resistance of these systems and their connections. Permanent corrugated metal forms can be used in lieu of conventional formwork. Where practical, use welded wire fabric rather than bar reinforcements. High early strength concrete may be used to facilitate rapid form removal.
Weight	Cut weight for subsequent savings throughtout the structure	Where foundation problems exist, avoid concrete construction in the superstructures or substitute lightweight concrete. For precast components shipped long distance, use lightweight concrete.

Table 7-1. Material Selection Factors (cont'd)

Factor	General Requirements	Considerations
Weight (cont'd)		Consider high strength concrete to reduce sizes of floor members and columns.
		One-way and two-way concrete rib slabs.
		Consider high strength steels for long span structures.
Strength	Materials must be adequate for erection loads.	Erection stresses for all precast members.
		The designer should consider the stresses due to handling and erection when designing the panel reinforcement. Top and bottom panel reinforcement should be used.
Stiffness	Increase stiffness to limit deflections.	Rib slabs for increased stiffness with little weight increase.
		Composite construction.
		Increasing depth of steel joists over minimum requirements for increased stiffness with little added weight.
Fireproofing	Selected materials in consonance with the fire rating requirements of the structure. (This is frequently the consideration in the selection of materials.)	Concrete construction is inherently fireproof and requires no further treatment.
		To reduce weight, consider vermiculite protection rather than concrete encasement for steel framing.
Ductility	Select materials capable of absorbing energy to tolerate deformations.	Avoid brittle materials such as conventional reinforced concrete and masonry.

Table 7-1. Material Selection Factors (cont'd)

Factor	General Requirements	Considerations
Moisture Protection	Limit moisture penetration into structure and prevent moisture (or condensate) from coming in contact with bar steel o timber.	Use dense concrete mixes.
		Provide waterstops at all joints in concrete walls and slabs below grade.
		Provide waterproofing for occupied spaces below grade.
		Use preservative-treated timbers.
Durability	Choose materials to ensure economic life of the project.	Consider air entrained concrete for structures exposed to extreme weather conditions.
		Corrosion resistant steel (particularly copper-bearing or some alloy steels) where maintenance is difficult.
		Use of protective coatings or treatments in lieu of more expensive materials.
		(a) Preservative-treated timbers.
		(b) Galvanizing.
		(c) Concrete jackets.

Table 7-1. Material Selection Factors (cont'd)

Factor	General Requirements	Considerations
Local labor and con	Use materials and construction methods familiar to local labor.	Avoid complicated systems or fabrications requiring unduly accurate positioning alignment or adjustments practice unless skilled labor is available. Use of prefabricated assemblies that can be erected by semi-skilled labor.
Expansive Soils	Select ductile structural systems.	Metal buildings systems even for types of buildings where metal is not normally considered. Load-bearing wall buildings consisting of steel joists bearing on precast concrete walls are flexible and should be considered.