MANUFACTURING SKILL STANDARDS COUNCIL

Definition of Advanced Materials

Manufacturers make extensive use of a wide variety of materials, especially ferrous metals, non-ferrous metals, and synthetics. Ferrous metals include mild steel, carbon steel, stainless steel, lead, cast iron, and wrought iron. They are used primarily used for their tensile strength and durability, especially mild steel which helps hold up the tallest skyscrapers and the longest bridges in the world.

Non-ferrous metals include aluminum, copper, lead, nickel, silicones, tin, titanium, tungsten, and zinc, and alloys such as brass. Generally, more costly than ferrous metals, non-ferrous metals are used because of desirable properties such as low weight, higher conductivity, non-magnetic property or resistance to corrosion.

Other materials used in manufacturing include synthetics such as composites, lightweight, ceramics, plastics, resins, and polymers. The latter include nylon, polyethylene, polyester, teflon, and epoxy and natural polymers such as fibers, wools.

A large enterprise with high levels of innovation, the materials sector of manufacturing is characterized by accelerated development of advanced materials, e.g., in composites, lightweight materials, micro and nanoscale fabrication, tissue engineering, bio fabrication, smart fabrics and fibers.

Sources: American Society for Metals; Metalssupermarkets.com; Bill Bonvillian, MIT