METAL BUILDING SYSTEMS

DESIGN AND SPECIFICATIONS

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CHAPTER 1
METAL BUILDING SYSTEMS: YESTERDAY AND TODAY

1.1 THE ORIGINS

1.1.1 What's in a Name?

Some readers may not be clear on the exact subject of our discussion. Indeed, even a few design professionals tend to be confused by the term *metal building system.* "Are we talking about a structural steel building? Just what kind of a building is it? Is it a modular building? Or prefabricated? Or maybe panelized? Is it the same as a pre-engineered building?"—you might hear a lot. Though all of these terms involve some sort of structure designed and partially assembled in the shop by its manufacturer, they refer to quite different concepts. Before proceeding further, the distinctions need to be sorted out.

Modular buildings consist of three-dimensional plant-produced segments that are shipped to a site for erection and final assembly by a field contractor. One of the most popular materials for modular buildings is wood, and such factory-produced units are common in housing construction. Another common application involves precast concrete formed into modular stackable prison cells that are completely prewired and prefinished. These modules are composed of four walls and a ceiling that also serves as a floor for the unit above. Modular steel systems, consisting of three-dimensional column and joist modules bolted together in the field, were marketed in the 1960s and 1970s, with limited success. Modern metal building systems, however, cannot be called modular.

Panelized systems include two-dimensional building components such as wall, floor, and roof sections, produced at the factory and field-assembled. In addition to the "traditional" precast concrete, modern exterior wall panels can be made of such materials as metals, brick, stone, and composite assemblies known as EIFS (Exterior Insulation and Finish System). While the exterior "skins" of metal buildings generally employ panels, the term *panelized* does not capture the essence of metal building systems and should not be used to describe them.

Prefabricated buildings are made *and* substantially assembled at the factory. While the metal building industry has its roots in prefabricated buildings, this type today includes mostly small structures transported to the site in one piece, such as toll booths, kiosks, and household sheds. Modern metal buildings are not prefabricated in that sense.

As we shall see, the changes in terminology parallel the evolution of the industry itself.

1.1.2 The First Metal Buildings

The first building with an iron frame was the Ditherington Flax Mill constructed in Shrewsbury, England, in 1796.[1] Cast-iron columns were substituted for the usual timber in a calico mill constructed in nearby Derby 3 years earlier. These experiments with iron were prompted by frequent devastating fires in British cotton mills of the time. Once the fire-resistive properties of metal in buildings had been demonstrated, wrought-iron and cast-iron structural components gradually became commonplace.