18
SPECIFICATIONS AND FIELD OBSERVATION

The quality, durability, and cost effectiveness of masonry systems are affected by decisions made throughout the design and documentation phases, and by field observation and inspection practices. Project specifications establish standards of quality, which should be strictly enforced to ensure structural integrity, weather resistance, and long service.

18.1 ECONOMIC CONSIDERATIONS

Exterior envelope materials are usually selected on the basis of both cost and aesthetics. An architect or building owner may begin with a mental image of the project that is related to its context, its corporate identity, and its budget. Masonry is very cost-competitive as an envelope material, but the decision to use masonry of one type or another is usually an aesthetic one. Material selections are based on color, texture, and scale.

The relative cost of different types of brick or different types of architectural block is related primarily to unit size and labor production. Typical union production rates for several types of brick and block are listed in *Fig. 18-1*. Within a selected size, however, aesthetic preference should govern unit selections, because the cost of materials has only a small effect on the cost of the completed envelope. According to one study, doubling the cost of brick added less than $2.00/sq ft to the wall cost. There are a number of other design and specification decisions that affect masonry cost and can be used to minimize budget limitations.

18.1.1 Factors Affecting Cost

Careful detailing and thoughtful design can enhance the cost economy of any building system. Conscientious planning and material selection, attention to detail, thorough specifications, and on-site field observation and inspection can all contribute to lower masonry costs. In masonry construction, unit size,

Mason Productivity				
Description	Unit Weight (lb.)	Unit Surface Area (sq.ft.)	Productivity (sq.ft/8 hr.)	Relative Productivity
4 x 2-2/3 x 8 standard brick	—	0.148	160	1.00
4 x 2-2/3 x 12 norman brick	—	0.222	207	1.28
4 x 4 x 8 economy brick	—	0.222	218	1.36
4 x 4 x 12 king size brick	—	0.333	242	1.51
12 x 8 x 16 hollow CMU	31.9	0.889	376	2.35
8 x 8 x 16 hollow CMU	26.2	0.889	467	2.92
4 x 8 x 16 hollow CMU	16.4	0.889	494	3.09
6 x 8 x 16 hollow CMU	21.1	0.889	526	3.29
8 x 8 x 24	normal weight 130 pcf concrete	1.333	696	4.35
8 x 8 x 24	lightweight 96 pcf concrete	1.333	786	4.91

Figure 18-1 Mason productivity varies with unit size. (*From NCMA* TEK Bulletin 54 *and NMCA Research and Development Laboratory, "Research Investigation of Mason Productivity,"* Masonry, *May/June 1989.*)

unit weight, and modular dimensions have as much or more influence on mason productivity (and therefore on cost) than any other factors.

- Larger-face-size units increase the area of wall completed each day, even though the mason may lay fewer units because of greater weight. This option is simple and cost-effective. The higher price of larger units can be offset by lower labor costs and by earlier completion of the work. For some designs, larger masonry units may actually give better proportional scale with the size of the building as well.
- All other factors being equal, mason productivity decreases as unit weight increases (*see Fig. 18-2*). Selection of unit weight (normal, medium, or lightweight) should be matched to project requirements for thermal resistance, fire resistance, water penetration resistance, and loadbearing capacity.
- Running bond patterns generally increase mason productivity, while decorative patterns and even stack bond patterns decrease productivity.
- Colored mortar costs more than ordinary gray mortar.
- Proper planning with modular dimensions increases productivity and reduces cost.
- Analytically designed brick or CMU curtainwalls can eliminate the need for shelf angles on buildings up to 100 ft or more in height.
- Mechanical and electrical lines and conduit are less expensive to place in double-wythe cavity walls than in single-wythe walls unless special concrete block units are used.
- Openings spanned with masonry arches or reinforced masonry lintels eliminate the need for steel angle lintels and the associated maintenance costs they include.