ALLIED CONCRETE Co.

COST COMPARISON

For purposes of comparison, the total cost - initial erection cost and the present worth of future costs connected with the wall over a 30-year usable life period - has been determined for each type of wall as used on a typical building containing 83,200 square feet of opaque wall area, built in Minneapolis, Minnesota. This total cost has then been expressed in terms of total cost per square foot of wall area.

Table 1 shows the total cost per square foot for each wall when all cost factors are combined. It is unlikely that the total costs incurred by the building owner will be equal exactly to those shown in the table; however, the "relative cost" is the most important factor for comparison purposes. The lowest cost is given as 100%, with other costs stated in reference to it.

The table shows that both of the brick wall systems are the most economical over the life of a building. Brick's total cost advantage is attributable not only to its low construction cost, but significant cost advantages found in masonry's low energy and maintenance costs.

TABLE 1. Building Walls	TOTAL COST (per sq. ft. of wall area)	RELATIVE VALUE
Brick/CMU Cavity	$125.41	100%
Brick Veneer/Steel Stud	$131.98	105%
Metal Panel	$138.40	110%
EIFS	$141.07	112%
Precast Concrete Panel	$177.25	141%
Double Plate Glass	$179.34	143%

The total costs in Table 1 were developed using Initial Costs and Future Costs as identified below. The "Present Worth" method of analysis was used for this comparison, in which all future expenditures are estimated according to their present values.

INITIAL COSTS

Realistic estimates of initial costs can be obtained from several reliable cost references. Estimates for the six walls used in this study have been taken from the 1996 edition of Building Construction Cost Data published by the Robert Snow Means Co. The estimated initial wall construction costs are for walls of a similar quality level within a given wall system. The cost per square foot, along with a description of each, is as follows:

Brick/Concrete Masonry Cavity Wall. The exterior wythe is utility-size brick with an interior wythe of 6-inch concrete masonry; a 4-inch cavity with 2 inches of extruded polystyrene insulation; interior finish of 22-inch metal studs (18 gage) at 16 inches o.c. with 2-inch gypsum board taped and painted. $14.27

Brick Veneer/Steel Stud. The exterior Wythe is utility-size brick with a backing wall of 6 inch-metal studs (16 gage) at 16 inches O.C.; 6-inch Kraft paper-faced Bat insulation between studs; 1- inch extruded polystyrene insulation on the outside of the studs; and 5/8 inch gypsum board taped and painted on the inside. $13.30

Pre-cast Concrete Panel. This wall is composed of a 6-inch thick flat panel with exposed aggregate on the outside; a 2-inch thick rigid insulation; 2 2-inch metal studs (18 gage) at 16 inches O.C.; and 2-inch gypsum board taped and painted on the inside. $22.81

Metal Panel. This is a factory-made, sandwich panel with porcelain enamel on both sides and 2-inch core filled with extruded polystyrene insulation; interior finish of 22-inch metal studs (18 gage) at 16 inches O.C. with 5/8-inch gypsum board taped and painted. $19.67

Double Plate Glass. This is a spandrel section of a double plate glass curtain wall. The interior has 2 inches of rigid, foil-faced insulation; 22-inch metal studs (18 gage) at 16 inches O.C.; and 5/8 inch gypsum board taped and painted. $56.12.

Exterior Insulation Finish System. This wall is 2-inch field applied, exterior insulation with heavy duty reinforcing mesh; 3 5/8-inch metal studs (16 gage) at 16 inches O.C.; and 5/8-inch gypsum board taped and painted on the inside. $17.38

TABLE 2. Initial cost of building walls	CONSTRUCTION COST (per sq. ft. of wall area)	RELATIVE VALUE
Brick Veneer/Steel Stud	$13.30	100%
Brick/CMU Cavity	$14.27	107%
EIFS	$17.38	131%
Metal Panel	$19.67	148%
Pre-cast Concrete Panel	$22.81	172%
Double Plate Glass	$56.21	422%

FUTURE COSTS

Maintenance

The maintenance of a wall may include such things as cleaning, pointing, and caulking. The cost and frequency of these operations can vary considerably. Reasonable estimates for this may be obtained from local maintenance contractors and standard reference works. Future maintenance costs are shown in Table 3.

All walls require replacement of sealant at a cost of $4.10 per linear foot about every 11 to 13 years. The brick veneer/steel stud wall will need re-pointing at 22 years at $2.54 per square foot. EIFS walls need repair work at 11 and 15 years. Glass wall gaskets and mullions need repair at 20 years, estimated at $6.14 per linear foot. Concrete patching and coating is needed at 26 years at $5.03 per square foot. The exterior of glass walls needs to be cleaned every year at 55 cents per square foot. Metal panels need washing every three years at 55 cents per square foot, brick every twenty-two years at 72 cents per square foot and pre-cast concrete every 26 years at 72 cents per square foot.

Energy Usage

A major expense over the life of a building is the cost of energy needed to heat and cool the interior. Today's energy codes require walls of certain thermal performance criteria. This performance can be approximated by the wall's thermal transmittance (U-value) and heat capacity (HC) properties. Careful attention to these two wall characteristics can optimize energy performance, thus saving on the future energy costs.

Utilizing walls with higher heat capacities in energy-sensitive design has distinct advantages. As a measure of the wall's ability to store heat, heat capacity is an indicator of the wall's potential for creating a thermal lag. Walls with high heat capacities can greatly increase the time before the outside temperatures affect the indoor environment. This allows the building owner to take advantage of Ashifting@ the bulk of the heating and/or cooling load to off-peak hours. Since utility rates vary with demand load, load shifting from peak demand hours can result in lower costs per Btu utilized, adding to the savings.

TABLE 3. Maintenance & Energy Costs	MAINTENANCE TASKS & FREQUENCY	MAINTENANCE COST	ENERGY COST
Brick/CMU Cavity	Replace joint sealant, yrs. 13 & 26; Clean, yr. 22	$20,021	$9,226,643
Brick Veneer/Steel Stud	Replace joint sealant, yrs. 13 & 26; Clean, yr. 22; Re-point, yr. 22	$67,717	$9,806,717
Double Plate Glass	Annual Cleaning Replace joint sealant, yrs. 13 & 26; Gasket replacement, yr. 20; Coat mullion, yr. 20	$626,459	$9,624,991
EIFS	Replace joint sealant, yrs. 11, 15 & 25; Repair cracks, yrs. 11, 25 & 30; Replace surfaces, yrs. 15 & 30; Cleaning, yrs. 15 & 30; Coating, yrs. 15 & 30	$350,087	$9,245,553
Metal Panel	Cleaning every 3 yrs.; Replace joint sealant, yrs. 12 & 24; Coating, yrs. 12 & 24	$303,037	$9,493,982
Pre-cast Concrete Panel	Re-coat panels, yr. 26; Re-coat panels, yr. 26; Cement patching, yr. 26; Cleaning, yr. 26	$124,766	$12,724,259

CONCLUSION

The economics involved in figuring the life cycle cost of a building depends upon a wide variety of factors which fluctuate with various conditions. The cost advantages outlined in this study may not bear out for every building in every location and under all conditions. By making the detailed comparative cost analysis and removing as much of the guesswork as possible from the decision-making processes, the owner and designer will find that brick walls do save dollars.

This guide is based upon the BIA brochure “Walls to Save Dollars.”