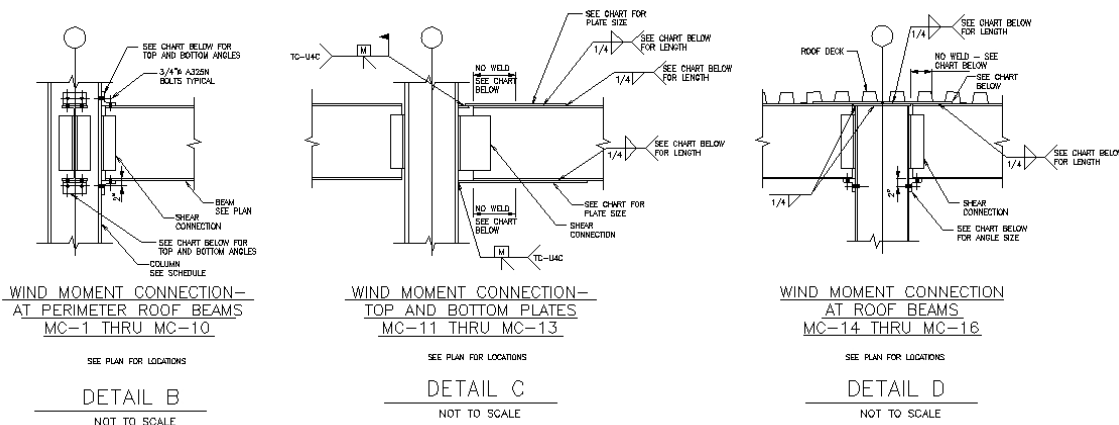




Construction Management Breadth

Introduction

One important aspect in any building is cost and the Hershey Academic Support Center is no different. With a total of 617 moment connections containing 2,329 bolts and 318.6 linear feet of weld, the lateral system poses a significant portion to the overall building cost. Each of the 16 different connections has a unique cost associated with the material and labor. Shown below are the three main connection types: top and bottom angles, top and bottom plates, and top plate and bottom angle.



Calculations

Chris Holcombe of Milton Steel was consulted as to what price their company would charge for three example connections. The cost includes both the fabrication and the labor to install the connection. RS Means was also consulted to determine each angle's price, but the values were significantly lower than the fabricators so they were not used. The three connections and their associated price are listed below:

MC-5

Connection Type #1: Top and Bottom Angles Common Example:

L6 X 4 X 3/4 X 0'-8"

4 bolts to the beam

2 bolts to the column

Priced at \$160 per connection



MC-12

Connection Type #2: Top and Bottom Plates Common Example:

Top Plate - 7 X 1/2 X 1'-8"

Bottom Plate - 12 X 3/8 X 2'-10"

Weld across end of plate - Top: 8", Bottom: -

Weld along plate per side - Top: 6", Bottom: 14"

Weld to column - TC-U4C for both

No weld length - Top: 1'-0", Bottom: 1'6"

Priced at \$328 per connection

MC-14

Connection Type #3: Top Plate and Bottom Angle Common Example:

Top Plate - 4 X 3/8 X 1'-6"

Weld along plate per side - 5"

Weld to column - 5"

No weld length - 6"

Bottom Angle - L3 1/2 X 3 1/2 X 1/2 X 0'-6 1/2"

2 bolts to the beam

Priced at \$145 per connection

From these prices, the other moment connections were priced. The angled connections were priced based on the size of the angle used and the number of bolts in contained relative to MC-5. Labor costs were decreased slightly for connections having less than 6 bolts. From Means, the breakdown of expenses by percentage for an angle connection is approximately 25% Material Cost and 75% Labor Cost. Extrapolation values are shown below:

MC-1 = \$165

MC-2 = \$165

MC-3 = \$103

MC-4 = \$160

MC-5 = **\$160**

MC-6 = \$107

MC-7 = \$160

MC-8 = \$99

MC-9 = \$101

MC-10 = \$99

The plated connections were priced based on the size of the plate used and the length of weld contained relative to MC-12. Labor costs were altered on a percentage basis from the originally priced connection. From Means, the



breakdown of expenses by percentage for an plate connection is approximately 25% Material Cost and 75% Labor Cost. Extrapolation values are shown below:

MC-11 = \$268
MC-12 = **\$328**
MC-13 = \$352

The last connection is a combination of the two methods and is priced in the same manner:

MC-14 = **\$145**
MC-15 = \$157
MC-16 = \$145

The above data clearly shows that welded connections are significantly more expensive than bolted ones, mostly due to the labor involved. RS Means also gives data that welded connections can take up to twice as long to complete when compared to bolted connections. The output comparison was 105 high strength bolts per day versus only 50 linear feet of weld per day. The average angled connection has 4-6 bolts total and the average welded connection has 3-4 linear feet of weld necessary.

