

COST COMPARISON
Cablofil Vs. Ladder Tray, Wishbone Tray
and Conduit System Installations

FORWARD

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INTRODUCTION

One of the most under-engineered elements of cable management today is the infrastructure, the means by which horizontal and backbone cabling routes from point to point. Cablofil provides a multitude of advantages over other methods of cable management.

There are many choices in designing a cable management infrastructure, but none of these choices allow engineers and designers the flexibility that Cablofil offers. Key benefits include engineering flexibility, cost containment, installation labor savings, and load capacity.

Defining the design process of a cable management infrastructure and implementing a solution that ensures future cable growth without compromising the infrastructure's strength is essential in today's marketplace.

ENGINEERING/FLEXIBILITY

When designing a cable management infrastructure there are several factors to consider: coordination with mechanical systems, plumbing systems, fire sprinkler systems, electrical systems, and building structure. Generally, cable management is one of the last considerations in the design and construction phases of a project. Therefore, a solution is required that will allow planning around these systems, despite not knowing their final destinations and elevations.

Prior to Cablofil, it was necessary to coordinate cable installation with the other design systems toward the end of the project. Because of these obstacles, there were continual changes in the field. However, with Cablofil, one can design a cable tray system at an early design phase in the project. Cablofil gives contractors the flexibility of making simple field changes without a change order.

Cablofil does not rely on special pieces to make corners, T's, up/down angles, or intersections. Simply make the necessary cuts in the cable tray according to the step-by-step guide, and a 90-degree radius bend or any other desired configuration can be achieved. This allows for navigating around HVAC units or routing below a series of plumbing pipes that were added by a design change during construction. It also means there is no need to provide a parts list of special angled pieces. This system provides ease of bidding and purchases for contractors and also limits the number of part numbers for an engineer to specify.

Cablofil also provides the flexibility of spare capacity without the need of lubricating the cables before they are installed by a move, add or change by the owner. In a conduit system, because of the high costs of installation, one

cannot afford the luxury of providing enough spare capacity in all routes.

Many clients have requested that the cable tray be designed in an exposed application to provide futuristic appeal to their corporate office space. Cablofil will match any color chip of choice at the request of an architect or owner. The colored chips can be used in an architectural application, or as a highlighted feature for a space. Cablofil provides the option of using label clips in a variety of colors that can identify the origin and destination points of the cable tray and cables, as well as contents within the cable tray.

COSTS/INSTALLATION

Cost is typically a factor when considering a new approach to design materials. A comparison of several different types of cable tray systems as well as a conduit system follows. Costs include materials, shipping weight/costs, and installation.

The study was comprised of ten thousand feet of cable tray, with four 90-degree corners, ten objects to presenting routing transitions, four 'T' intersections and four end wall connections to support the cabling infrastructure. Five thousand feet of cable tray was wall mounted and five thousand feet of tray was trapeze hung with two six-foot threaded rods or center hung with one six-foot threaded rod (wishbone tray only). All pieces of the tray were grounded using the manufacturers' ground straps and kits. The following Table shows the results of the study.

This study does not reflect the time nor cost savings to the cable contractor. Cable installers have indicated that with the addition of the FAS Rollers, the labor to pull cable was significantly reduced. Another study has also shown that

Table 1

Cablofil		
Study based on 10,000ft	Materials	Labor
Description		
10' sections of tray (12")	\$64,170.00	\$22,560.00
45° & 90° bends (12")	\$140.87	\$2,289.65
Butt splices	\$4,136.20	\$9,900.00
Junction splices (Tee)	\$13.03	\$199.10
End wall supports	\$7.56	\$52.80
Angle arm wall supports	\$2,143.75	\$8,250.00
Trapeze ceiling kits	\$2,032.25	\$10,312.50
Treaded rod (3/8, 1/4, 1/2-6")	\$5,437.50	\$14,437.50
Grounding kits	\$199.80	\$121.00
Waterfalls (cable exit)	\$97.20	\$242.00
Totals	\$78,386.16	\$68,354.55
Difference	Base	Base
Total Materials+Labor	\$146,740.71	
Overall increase in cost	Base	

Ladder Tray		
Study based on 10,000ft	Materials	Labor
Description		
10' sections of tray (12")	\$57,670.00	\$53,350.00
45° & 90° bends (12")	\$3,866.08	\$1,672.00
Butt splices	\$6,810.00	\$6,050.00
Junction splices (Tee)	\$24.28	\$70.40
End wall supports	\$59.60	\$68.20
Angle arm wall supports	\$23,218.75	\$10,656.25
Trapeze ceiling kits	\$8,362.50	\$27,500.00
Treaded rod (3/8, 1/4, 1/2-6")	\$10,837.50	\$18,500.00
Grounding kits	\$14,670.00	\$12,100.00
Waterfalls (cable exit)	\$470.60	\$286.00
Totals	\$124,969.31	\$126,252.85
Difference	159%	188%
Total Materials+Labor	\$253,242.16	
Overall increase in cost	+73%	

Wishbone Tray		
Study based on 10,000ft	Materials	Labor
Description		
10' sections of tray (12")	\$116,550.00	\$37,675.00
45° & 90° bends (12")	\$2,056.56	\$1,016.40
Butt splices	\$6,320.00	\$8,900.00
Junction splices (Tee)	\$250.00	\$39.60
End wall supports	\$59.72	\$35.20
Angle arm wall supports	\$6,360.00	\$8,800.00
Trapeze ceiling kits	\$6,320.00	\$8,800.00
Treaded rod (3/8, 1/4, 1/2-6")	\$2,175.00	\$8,350.00
Grounding kits	\$9,140.00	\$5,500.00
Waterfalls (cable exit)	\$298.60	\$231.00
Totals	\$140,531.88	\$80,247.20
Difference	191%	117%
Total Materials+Labor	\$229,779.08	
Overall increase in cost	+57%	

EMT Conduit		
Description	Materials	Labor
10' section of EMT (4")	\$67,425.00	\$57,750.00
45° & 90° factory bends (4")	\$1,867.00	\$7,331.50
Couplers (4")	\$15,250.00	\$41,250.00
24"x24"x8" j-box w/conn. (4")	\$502.24	\$1,576.52
2" unistrut with 4" hangers	\$3,545.00	\$11,797.50
2" unistrut with 4" hangers	\$3,545.00	\$11,797.50
Threaded rod (1/2"-6")	\$8,520.00	\$37,620.00
Grounding bushing (2")	\$900.00	\$6,765.00
EMT (2") w/box conn. (2")	\$492.00	\$4,070.00
Totals	\$101,846.24	\$179,958.02
Difference	130%	263%
Total Materials+Labor	\$281,804.26	
Overall increase in cost	+92%	

GRC Conduit		
Description	Materials	Labor
10' section of GRC (4")	\$150,031.00	\$165,489.50
45° & 90° factory bends (4")	\$2,722.04	\$11,000.00
Couplers (4")	\$15,000.00	\$55,000.00
24"x24"x8" j-box w/conn. (4")	\$502.24	\$1,576.52
2" unistrut with 4" hangers	\$3,545.00	\$11,797.50
2" unistrut with 4" hangers	\$3,545.00	\$11,797.50
Threaded rod (1/2"-6")	\$8,520.00	\$37,620.00
Grounding bushing (2")	\$900.00	\$6,765.00
GRC (2") w/box conn. (2")	\$653.00	\$4,009.50
Totals	\$185,468.28	\$305,065.52
Difference	237%	446%
Total Materials+Labor	\$490,523.80	
Overall increase in cost	+234%	

when comparing a Cablofil installation to a ring system installation (D-ring, J-hooks, etc.), and with the cable pulling labor factored in, the contractor was able to save considerable time and money on the Cablofil installation.

As you can see from Table 1, Cablofil is less expensive to use than other systems. Using Cablofil as our base, the results show that ladder tray's costs were consistent: both materials and labor were higher. Wishbone's tray labor was similar to the Cablofil install cost, but the materials were nearly twice the cost. EMT conduit materials were approximately 30% higher and the labor costs were two and a half times as much as Cablofil. Galvanized Rigid Conduit (GRC) increases the cost of materials and labor drastically.

In this industry, labor prices fluctuate in various ways: time of the year, labor pool shortages, schedule of project, etc. Since material costs are relatively fixed, projects that specify Cablofil are sure to minimize the costs of labor; therefore reducing the chance of fluctuating bid costs. So not only can you save costs by specifying and installing Cablofil, you can also maintain control over your bid numbers, and resolve construction issues effectively.

Many contractors who have used Cablofil on projects have commented on the ease of installation. The fact that they could make field changes without waiting for a specific part is very economical for them. Contractors use less time for installation, therefore saving time and money, which is then passed on to the owner. In this era of compressed construction schedules, the contractor will be able to stay ahead of the cable pullers.

LOAD/FILL

Cablofil's load capabilities exceed the requirements for a fully loaded cable tray. For example, a 12"-wide, 2"-high (CF 54/300) cable tray will hold up to 214 Category 6 cables or 262 Category 5e cables at a 40% fill ratio. Utilizing Category 6 horizontal cable at 27-lbs/1000 ft would bring the total to 5.778 lbs./ft over a 12"-wide tray. Category 5e cable at 22-lbs/1000 ft would equate to 5.764 lbs./ft over the same tray. See load charts to the right for information.

According to the load tables, Cablofil can handle over six times the amount of Category 5e or Category 6 horizontal cable. Other tray systems are made to handle up to (35) times that amount, making them impractical in cabling applications. The excessive material weight from the other systems is directly related to extra costs and is then passed on to the consumer.

CONCLUSION

As organizations recognize the promise of faster technology, they are beginning to realize the need for a scalable and flexible cable management infrastructure. As a result, cable trays are becoming more common than ring or conduit systems. In fact, as the cabling needs grow, Cablofil can be expanded by adding a second tier without having to add extra supports.

The engineering challenges for implementing a cable management infrastructure that can meet the requirements of today, as well as providing for future needs, can be difficult. But, by using a Cablofil system, material and installation costs can be lowered, passing the savings directly to the owner.

Table 2a Cablofil - IEC 61537 Safe Working Load Values

Safe Working Load (lb/ft)	Span (ft)					
Size	4	5	6	7	8	9
CF54/50	22.6	18.1	14.0	11.3	9.3	7.4
CF54/100	22.6	18.1	14.0	11.3	9.3	7.4
CF54/150	31.0	25.1	19.8	16.0	13.4	11.0
CF54/200	31.0	25.1	19.8	16.0	13.4	11.0
CF54/300	45.0	36.0	27.7	22.1	18.1	14.6
CF54/400	86.6	65.0	45.5	33.8	26.1	19.4
CF54/500	86.6	65.0	45.5	33.8	26.1	19.4
CF54/600	87.4	67.0	48.7	37.8	30.3	23.7
CF105/100	39.8	32.3	25.4	20.8	17.7	14.9
CF105/150	39.8	32.3	25.4	20.8	17.7	14.9
CF105/200	52.4	43.8	35.9	30.1	25.4	21.2
CF105/300	91.6	73.2	56.2	44.9	37.4	30.6
CF105/400	91.6	73.2	56.2	44.9	37.4	30.6
CF105/500	110.1	89.8	71.0	57.7	47.6	38.5
CF105/600	110.1	89.8	71.0	57.7	47.6	38.5
CF150/200	100.9	82.9	66.1	54.6	46.4	38.9
CF150/300	100.9	82.9	66.1	54.6	46.4	38.9
CF150/450	161.5	128.2	97.5	77.1	63.0	50.4
CF150/500	161.5	128.2	97.5	77.1	63.0	50.4
ZF150/600	161.5	128.2	97.5	77.1	63.0	50.4

This data is from test results per the requirements of IEC 61537, the global standard for cable tray requiring a maximum deflection of L/200 where L = support span.

*Table 2b *Load table originated from B-Line*

Tray Width	Rung Spacing	Support Span				
		5ft	6ft	8ft	10ft	12ft
in.	in.	lbs/ft	lbs/ft	lbs/ft	lbs/ft	lbs/ft
6	6	646	448	252	161	112
	9	532	448	252	161	112
	12	400	400	252	161	112
9	6	532	448	252	161	112
	9	354	354	252	161	112
	12	266	266	252	161	112
12	6	400	400	252	161	112
	9	266	266	252	161	112
	12	200	200	200	161	112
18	6	266	266	252	161	112
	9	178	178	178	161	112
	12	134	134	134	134	112
24	6	200	200	200	161	112
	9	134	134	134	134	112
	12	100	100	100	100	100