Sales Engineering Technical Paper Series

Cable Tray Selection – Choosing the Proper Support Spacing

As the need for cable tray expands to all industries, commercial and industrial, the need for specific products that fit each industries requirements are needed. To accommodate all industries, cable trays are offered in different materials, finishes, lengths and load ratings. Multiple options encourage more cost effective installations by diminishing the amount of supports needed. Whether your installation is outside, or inside in a confined area, there is a tray available to fit your needs. Let us first cite and define the span categories that are now available.

Short Span Commercial: Light duty trays, used indoor for non-industrial projects, and supported on spans of six to eight feet. *Products:* Half Rack, Wire Basket, and Cable Channel.

Intermediate Span Commercial: Medium duty trays, used indoor for non-industrial projects, and supported on spans of ten to twelve feet. *Products:* Cent-R-Rail, Redi-Rail, and Series 1 Steel and Aluminum Cable Trays.

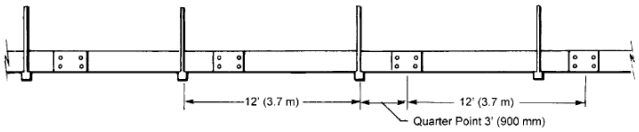
Intermediate Span Industrial: Medium duty trays, used indoor/outdoor for industrial projects, and supported on spans of ten to twelve feet. *Products:* Redi-Rail, and Series 2 Steel and Aluminum Cable Trays.

Long Span Industrial: Heavy-duty trays, used indoor/outdoor for industrial projects, and supported on spans of fourteen to twenty feet. *Products:* Series 3 & 4 Aluminum, and Series 3 & 4 Steel and Stainless Steel Cable Trays.

Extra Long Span Industrial: Heavy-duty trays, used indoor/outdoor for industrial projects, and supported on spans of over twenty feet. *Products:* Series H4, H57, and S8A Aluminum, and Series 5 Steel Cable Trays.

Tray supports can make up a large portion of the costs incurred during a tray installation. Not only are supports expensive, but labor costs are also increased. Therefore, to ensure a cost effective installation it is important to specify the correct support span and loading. If this is done I will assure you that the tray installation will be quicker, and more cost effective, without sacrificing quality and safety.

When supporting cable tray, Section 4.3.1 of the NEMA VE-2 document suggests that tray be supported at ¼ span. With the supports at ¼ span, the stress on the splice plates is approximately zero. Using this method will maximize the rigidity of the system.



Recommended Cable Tray Support Locations

When installing a 20-foot section of cable tray, a support spacing of 20-foot is optimal. This will allow your splice plates to fall at the same location of the span every time. The same rule stands for all standard lengths of cable tray. Not only are you maximizing the rigidity of the system, but you will also eliminate unnecessary supports. This support method is the key to selecting the most cost effective tray installation.

When sizing cable tray, there is no reason to specify a tray that supports an enormous load capacity. When installing tray per Article 392 of the 2002 National Electric Code, the amount of cable load that can be placed in the tray is limited. To better describe this statement a list of maximum cable loads for power and communication applications has been provided.

Power Application:
Calculated Cable Weights in Lbs/Ft:

	Tray Width						
	36”	**30”**	**24”**	**18”**	**12”**	**9”**	**6”**
Load lbs/ft	140	115	90	70	45	35	23

***Cable weights and fill calculated using steel armor, 600V, 4 conductor 750 kcmil cables**

Communication Application:
Calculated Cable Weights in Lbs/Ft:

	Tray Width						
	36”	**30”**	**24”**	**18”**	**12”**	**9”**	**6”**
6” Fill	81	64	52	41	27	27	14
5” Fill	68	53	43	34	23	17	12
4” Fill	54	43	35	27	18	13	9
3” Fill	41	32	26	21	14	10	7

*** Cable fill calculated using NEC article 392.9(B)**
***Cable weights and fill calculated using 4 UTP CAT 5 cables.**

After reviewing the tables, we find the max load that can be placed in a 36” wide tray during a power install is 140 lbs/ft, and for a communication installation 81 lbs/ft. It is easy to see that supporting trays in a configuration that enables the support of enormous load capacities is not needed, and will only increase material and labor costs.

For instance, if a NEMA 20C tray (100 lbs/ft on a 20-foot span) is required, 20-foot lengths of tray should be specified. It is not economical to specify a NEMA 20C tray, and turn around and specify a support spacing of 12-feet. Lets consider our 46A series cable tray, which supports 103 lbs/ft on a 20-foot span (NEMA 20C). If this tray were supported on 12-foot centers the loading jumps up to a capacity of 286 lbs/ft. Not only has the installation and support costs been driven up for this install, but so has the tray cost itself. If 12-foot spans were needed, the suggested tray would be our 26A series, which has a NEMA 12C rating (100 lbs/ft on a 12-foot span). In the table below we show a cost comparison for each scenario above, 46A on a 20-foot span, 46A on a 12-foot span, and 26A on a 12-foot span.

	46A09-12-240		**26A09-12-144**
Support Length	**20-Foot Span**	**12-Foot Span**	**12-Foot Span**
Cost Comparison	100%	110%	92%

*** Based off a 1000-foot straight run**
****Price includes tray and trapeze supports using 3/8” all thread rod and anchors.**
*****Labor costs for trapeze kits supplied by RS Means.**

The above table was created using a base percentage of 100% for 46A tray supported on a 20-foot span. When supporting 46A on a 12-foot span it is 10% more expensive, not including labor costs for the added supports. Labor and material costs will also rise if beam clamps will be needed. It is evident that if a 12-foot support span is needed it is more cost effective to use the 26A, which still provides a NEMA 12C rating (100 lbs/ft on a 12-foot span), and will save approximately 18% in material cost alone.

Using the above example, we have effectively reduced material and labor costs. This has been accomplished by purchasing a tray that fits the application.

When designing cable tray layout, asking a few simple questions may be the difference between $100,000 and $82,000. First, what is my application? Is it commercial or industrial, does available space limit my support options? Use these questions to first determine the support span to be used. Second, determine cable loading, and coordinate that load with a logical support span. If a cable load is not known, the maximum loading tables may be used to determine the types of load that could be encountered. By following these simple rules material costs can effectively be reduced by 15 to 20 percent. During the economic times at hand, these simple rules may make the difference between winning a losing a job.