RJ-DR-523-020
April 9, 1958

RESEARCH PAPER

CABLE INSTALLATION COSTS

by

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ABSTRACT

This material has been prepared for use in balancing intra-plant cable costs with the cost of multiplexing and terminal equipment which would permit lower cost cables. The material, labor, and total costs per lineal foot of communications cable are tabulated for number 19, 22, and 24 gauges for one, 16, and 51 pair cables for different types of installations. These costs are based on prevailing prices and wage rates in San Jose, California, on December 31, 1957.

This report, based on estimates, prepared by Department 706, Plant Engineering, San Jose, at the request of Department 523 of the San Jose Research Laboratory contains information intended primarily for the persons on the distribution list. Comments or requests for information should be directed to the author.

Introduction

The cable costs in this report have been prepared by the Plant Engineering Department in San Jose for the purpose of providing some examples of communication cable installation costs for use by the IBM Data Transmission Committee.

The analysis of intra-plant communication between many terminal stations and a central file or computer sometimes shows that cable costs are as high, or higher, than the cost of the terminal and multiplexing equipment. This makes it important to have sample calculations of cable costs so that the relative costs of simple terminal and multiplex equipment used with expensive multi-conductor cables can be compared with the cost of more complex equipment used with more economical cable pairs.

These different costs represent different cases a customer might encounter such as:

a. New construction where the cost includes the cost of placing conduit before pouring the concrete.

b. Installation in old buildings where the conduit is installed exposed on existing walls, ceilings, or beams.

c. Installation between buildings on customer property where space is available in existing concrete ducts.

A breakdown between material and labor and details of the assumed conditions are provided so one can estimate the relevance of these examples to other cases. These estimates are for conditions prevailing at San Jose, California, as of December 31, 1957. Substantial price increases have already occurred since then.

There is an Underwriters Laboratory Specification* that covers the wiring of interoffice communication equipment and signaling appliances. It covers No. 22 AWG cable for use on Class 2 circuits as described in Article 725 of the National Electrical Code where the power supply is rated at not over 100 volt-amperes and 150 volts and where the operating temperature does not exceed 60° C. Costs are included for No. 19 and 24 AWG cable in addition to No. 22 since all three sizes are commonly used for telephone cables.

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* Underwriters Laboratories, Inc., Subject 13, "Thermoplastic-Insulated Low Energy Circuit Cable," May 28, 1954.

UNIT COST DATA ON CABLE INSTALLATION

The following unit prices are based on the following assumed conditions:

A. Special terminal devices such as cannon plugs, etc., are not included. A 5'-0" long pig-tail is provided at both ends of the cable run for direct connection to the machines.

B. Extended lengths of 100 feet or more require a pull box at 100 foot intervals. Runs of 100 feet or less do not require intermediate pull boxes.

C. Conduit embedded in the slab can be installed in a straight line between machines, whereas an average of 35% additional conduit and cable will be required for exposed conduit run to preserve the appearance of such installations.

D. Pull and junction boxes are standard, galvanized, pressed steel 4" or 4-11/16" square outlet boxes fitted with bushed, chase-nippled cover plates at both ends of the run and blank cover plates for intermediate pull boxes.

E. The use of "Inside-Outside" telephone cable with Polyethylene insulated copper conductors and Polyvinyl-Chloride jacket, has been assumed for all conditions.

F. 10% additional cost has been included in the material cost to cover conduit straps, bushings, locknuts, etc.

G. A 25% markup together with 4% sales tax has been applied to the net (Contractor's) cost of materials.

H. Labor cost data has been derived from the National Electrical Contractor's Association Manual of labor units.

I. The following percentage buildup has been applied to the cost of labor (local conditions).

	Straight Time
Compensation	2.00%
Property Damage	1.00%
Public Liability	1.00%
Federal & State Unemployment	2.50%
Federal Social Security	2.50%
Union Welfare	1.50%
N.E.C.A.	1.00%
TOTAL	11.5 %

	Journeyman	Foreman
Base Rate	3.81	4.28
Insurance, benefits, etc. (11.5%)	.44	.49
	4.25	4.77
Plus 10% Overhead	.43	.48
	4.68	5.25
Plus 10% Profit	.47	.53
GRAND TOTAL	$5.15/hr.	$5.78/hr.

SUMMARY SHEET

Assumed Conditions

WIRE SIZE A.W.G.	NO. OF PAIRS	100 Ft. Run in Rigid Steel Conduit Imbedded In Floor Slab — Installed Cost in Dollars Per Lineal Foot of Cable			500 Ft. Run in Rigid Steel Conduit Imbedded In Floor Slab — Installed Cost in Dollars Per Lineal Foot of Cable		
		MATERIAL	LABOR	TOTAL	MATERIAL	LABOR	TOTAL
	1	.48	.31	.79	.50	.33	.83
#19	16	.95	.60	1.55	.97	.62	1.59
	51	1.77	.78	2.55	1.80	.82	2.62
#22	1	.45	.30	.75	.47	.33	.80
	16	.66	.43	1.09	.68	.46	1.14
	51	1.40	.74	2.14	1.43	.78	2.21
#24	1	.44	.30	.74	.46	.33	.79
	16	.60	.40	1.00	.65	.45	1.10
	51	1.06	.61	1.67	1.10	.66	1.76
		100 Ft. Run in Rigid Steel Conduit, Exposed, 12 Ft. Ceiling Height			500 Ft. Run In Rigid Steel Conduit, Exposed, 12 Ft. Ceiling Height		
#19	1	.51	.81	1.32	.53	.86	1.39
	16	1.23	1.59	2.82	1.25	1.62	2.87
	51	2.05	2.67	4.72	2.08	2.70	4.78
#22	1	.46	.79	1.25	.48	.84	1.32
	16	.89	1.11	2.00	.91	1.14	2.05
	51	1.76	2.20	3.96	1.78	2.24	4.02
#24	1	.45	.78	1.23	.47	.83	1.30
	16	.82	1.06	1.88	.84	1.09	1.93
	51	1.34	1.75	3.09	1.36	1.78	2.14
		100 Ft. Run in Underground Concrete Duct (Existing)					
#19	1	.06	.07	.13			
	16	.34	.28	.62			
	51	.92	.36	1.28			
#22	1	.03	.06	.09			
	16	.22	.18	.40			
	51	.58	.28	.86			
#24	1	.03	.04	.07			
	16	.17	.14	.31			
	51	.44	.26	.70			

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