

*PROGRAM DEMAND COST MODEL
FOR
ALASKAN SCHOOLS*

Introduction, Instructions and Tables



15th Edition
April 2016



FOREWORD

The cost estimate for the Program Demand Cost Model for Alaskan schools was originally developed for the State of Alaska, Department of Education in 1981, and has been used over the years with considerable success. It has been updated from time to time through this, the 15th Edition.

This 15th Edition Program Demand Cost Model has been developed by HMS Inc., 4103 Minnesota Drive, Anchorage, Alaska 99503. It is a complete demand cost model for both new construction (or major additions) and renovation.

The intent of the Program Demand Cost Model is to establish a complete budget for each facility, useful for legislative requests or bond issues, or other forms of appropriation to be placed before the electorate. Also, it can be used merely as a feasibility analysis with the developed educational specifications and this Program Demand Cost Model without going to the expense of producing architectural drawings or engineering reports. The secondary use for the cost estimate Program Demand Cost Model is to establish the present replacement value for insurance purposes.

Prices and unit rates are based on early 2016 costs for materials, equipment and freight, and labor rates. It should be noted that this is a method to develop a budget only and actual costs will vary. The Program Demand Cost Model will not be applicable for specific projects with developed design beyond concept level.

Escalation is factored in. Refer to HMS Inc.'s Alaskan Construction Escalation Index, Table No. 3, of this report.

Program Demand Cost Models: 1st Edition - May 1981; 2nd Edition - November 1983 (computerized in December 1984); 3rd Edition - August 1986; 4th Edition - August 1988; 5th Edition - June 1991; 6th Edition - July 1997; 7th Edition - November 1997, 8th Edition (7th Revised) - March 2000; 9th Edition - April 2001; 10th Edition - March 2005; 11th Edition - April 2007, 11th Edition Update - March 2008, 11th Edition Revised - April 2009, 12th Edition - April 2010, 12th Edition Update - April 2011, 12th Edition Revised - April 2012, 13th Edition - April 2013; 14th Edition - April 2015; 15th Edition - April 2016.



INSTRUCTIONS ON HOW TO USE THE PROGRAM DEMAND COST MODEL

The Program Demand Cost Model is created in Microsoft Excel 2010.

To start, open the template and save a copy on your hard drive.

Starting with the Project Summary sheet, fill in the necessary information in the **RED** cells only (school district, project, location and date), and all other sheets will format accordingly. For a renovation project, the square foot quantity must be placed in the appropriate cell. The new construction square foot quantity is calculated using the quantities placed within the model.

Next, go to Tab 1.0 for New Construction, or Tab 11.00 for Renovation Work. Place quantities in applicable **RED** cells. Please note, the red cells are the only cells that can be edited. HINT: If you use the tab key, you will move from cell-to-cell on those requiring input.

Proceed through the other tabbed sheets. All subtotal calculations and summary sheets will be calculated automatically.

After completing the variable information make sure to save your work. You can print the entire workbook by selecting File, Print, Entire Workbook.



BIBLIOGRAPHY

Guide for School Facility Appraisal - Alaska Edition (Adapted for the State Alaska - Department of Education): The Council of Education Facility Planners, International - May 1994.

Cost Estimate Program Demand Model - State of Alaska, Department of Education.

HMS Inc. 1st Edition - May 1981; 2nd Edition - November 1983 (computerized in December 1984); 3rd Edition - August 1986; 4th Edition - August 1988; 5th Edition - June 1991; 6th Edition - July 1997; 7th Edition - November 1997, 8th Edition (7th Revised) - March 2000; 9th Edition - April 2001; 10th Edition - March 2005; 11th Edition - April 2007, 11th Edition Update - March 2008; 11th Edition Revised - April 2009; 12th Edition - April 2010, 12th Edition Update - April 2011, 12th Edition Revised - April 2012; 13th Edition - April 2013; 14th Edition - 2015.

Cost Data Files and Records. HMS Inc., 1980 through early 2016.

Title 36, Public Contracts: Laborers' and Mechanics' Minimum Rates of Pay, State of Alaska, Department of Labor, dated April 2016 and review of changes to the Davis Bacon Act.

Department of Education, Appendix D: Type of Space Added or Improved by the Bond Reimbursement & Grant Review Committee, April 18, 1997.

Size Adjustment Factor

Based on a formula developed for the Department of Defense USA federal government projects.



TABLES

- No. 1 - Geographic Area Cost Factor
- No. 2 - Size/Dollar Adjustment Factor
- No. 3 - Alaskan Construction Escalation Index
- No. 4 - DEED Instruction CIP Application, Appendix D
- No. 5 - Abbreviations
- No. 6 - Statement of Specifications



TABLE NO. 1
GEOGRAPHIC AREA COST FACTOR
APRIL 2016

	INDEX	PERCENTAGE
Alaska Gateway	125.20	25.20%
Aleutian Region	154.50	54.50%
Aleutians East	128.70	28.70%
Anchorage (Base)	100.00	0.00%
Annette Island	124.40	24.40%
Bering Strait	181.20	81.20%
Bristol Bay Borough Schools	128.70	28.70%
Chatham	124.40	24.40%
Chugach	108.50	8.50%
Copper River	113.90	13.90%
Cordova	108.50	8.50%
Craig City Schools	112.40	12.40%
Delta/Greely	119.63	19.63%
Denali Borough	119.63	19.63%
Dillingham City Schools	133.54	33.54%
Fairbanks	105.00	5.00%
Galena	139.30	39.30%
Haines	112.40	12.40%
Hoonah City Schools	124.40	24.40%
Hydaburg City Schools	124.40	24.40%



TABLE NO. 1
GEOGRAPHIC AREA COST FACTOR
APRIL 2016

	INDEX	PERCENTAGE
Iditarod Area Schools		
Yukon River Village	143.05	43.05%
Kuskokwim River Village	154.50	54.50%
Landlocked Village	160.90	60.90%
Juneau City/Borough Schools	103.60	3.60%
Kake City Schools	122.90	22.90%
Kashunamuit	152.36	52.36%
Kenai Peninsula		
Kenai/Soldotna	98.60	-1.40%
Homer Area	105.50	5.50%
Ketchikan	110.80	10.80%
Klawock City Schools	124.40	24.40%
Kodiak Island		
Kodiak	112.40	12.40%
Village	124.40	24.40%
Kuspuk Schools	154.00	54.00%
Lake & Peninsula		
Gulf of Alaska Village	124.40	24.40%
Bristol Bay Village	136.04	36.04%
Landlocked Village	160.73	60.73%
Lower Kuskokwim		
Bethel	156.10	56.10%
Villages	167.10	67.10%
Lower Yukon	167.10	67.10%
Mat-Su Borough Schools		
Palmer - Wasilla	99.00	-1.00%
Other Areas	105.50	5.50%
Nenana City Schools	116.50	16.50%



TABLE NO. 1
GEOGRAPHIC AREA COST FACTOR
APRIL 2016

	INDEX	PERCENTAGE
Nome City Schools	156.10	56.10%
North Slope Borough		
Barrow	171.80	71.80%
Villages	182.20	82.20%
Atqasuk/Pt. Lay	199.90	99.90%
Northwest Arctic Schools		
Kotzebue	150.18	50.18%
Villages	181.50	81.50%
Pelican City Schools	124.40	24.40%
Petersburg City Schools	110.80	10.80%
Pribilof Island Schools	164.70	64.70%
Sitka City Borough	110.80	10.80%
Skagway City Schools	110.80	10.80%
Southeast Island Schools	123.19	23.19%
Southwest Region Schools	140.91	40.91%
St. Mary's School District	159.75	59.75%
Tanana City Schools	134.65	34.65%
Unalaska City Schools	140.00	40.00%
Valdez City Schools	109.30	9.30%
Wrangell City Schools	110.80	10.80%
Yakutat City Schools	115.40	15.40%
Yukon Flats		
Village on Road System	122.95	22.95%
Village on River	141.80	41.80%
Landlocked Village	159.73	59.73%



TABLE NO. 1
GEOGRAPHIC AREA COST FACTOR
APRIL 2016

	INDEX	PERCENTAGE
Yukon-Koyukuk		
Village on Road System	122.95	22.95%
Village on Yukon River	141.80	41.80%
Village on Koyukuk River	154.50	54.50%
Yupiit Schools	152.36	52.36%

NOTES:

This is an estimate of geographic area cost factors based on averages for materials, freight, equipment costs, and current Title 36 labor rates. The cost factors are based on an institutional building in Alaska using a standard AIA contract or similar contract. This is merely a guide, actual costs will vary.

This is only a guide and not necessarily correct for any specific need. It represents only a collection of costs normally found on some construction projects, rather than the custom requirements of a particular project.

This is not an index. This is a geographic area cost factor which includes not merely cost changes and logistical consideration, but also design criteria and how it is applied in different locations. Such design considerations would normally include standard concrete footings used mostly in Southcentral and Southeastern Alaska, to piling requirements in arctic and sub-Arctic, however, as this is a line item in the cost model, it has **not** been included in these calculations.

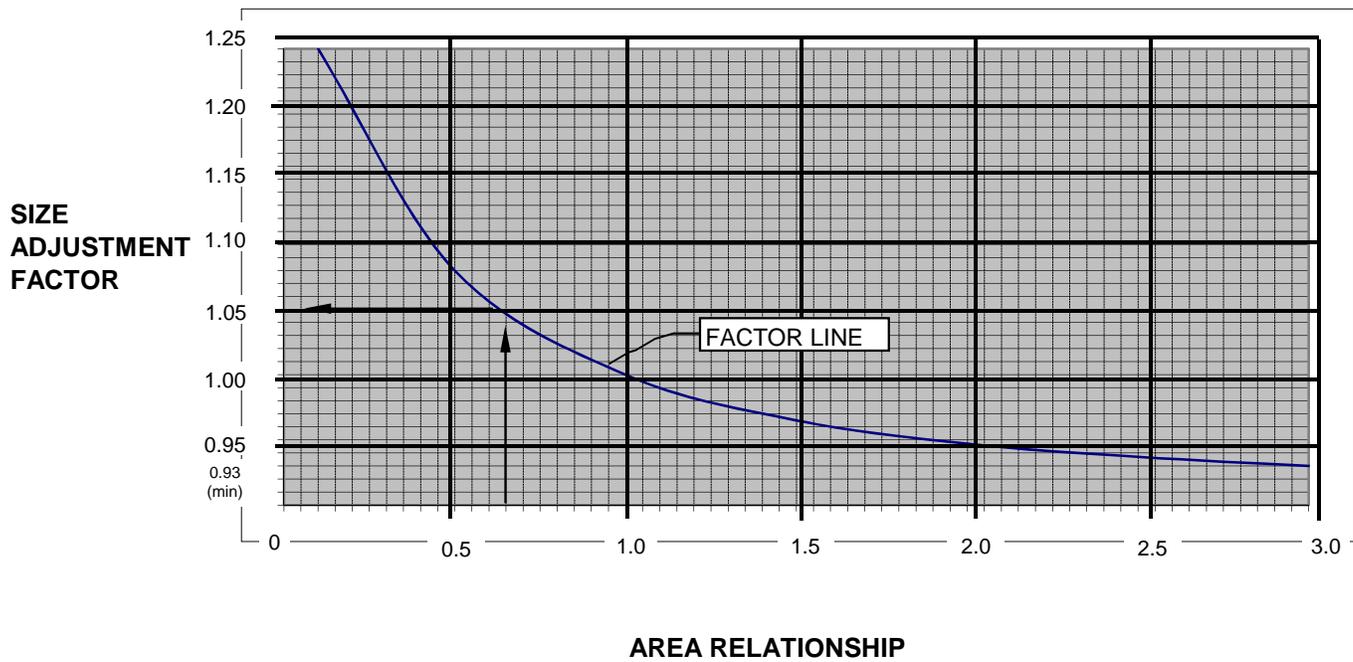
The calculation used in developing these cost factors are based on reasonable assumptions. For example, barge freight is mostly included rather than air freight for all materials and equipment. It is also assumed that local labor can be used to the fullest general availability, rather than all imported workers.

Village-to-village costs will vary plus or minus 5%. When using this geographic cost factor, consider how the location for which the estimate is being prepared is different from other surrounding places.

Regional cost factors are based on general and approximate calculations for anticipated conditions generally found in the area and logistic considerations. The more specific area factors are more subjective and based on opinion rather than any detailed analysis.



TABLE NO. 2a
SIZE ADJUSTMENT FACTOR



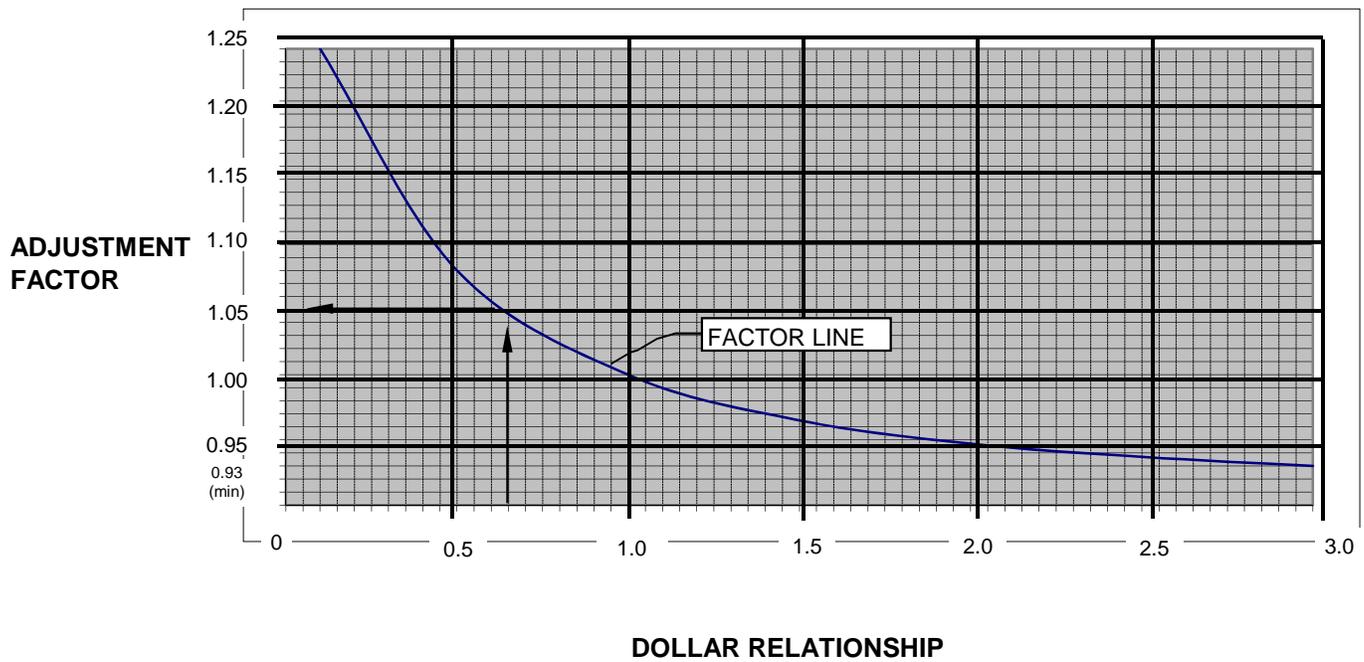
EXAMPLE: The Size Adjustment Factor is desired for a 16,000 SF Academic Facility.

AREA RELATIONSHIP:
$$\frac{\text{PROPOSED FACILITY SIZE}}{\text{TYPICAL FACILITY SIZE}} = \frac{16,000 \text{ SF}}{25,000 \text{ SF}} = 0.64$$

Find .64 on the horizontal axis. Trace a vertical line to the factor curve and then trace a horizontal line to the vertical axis' Size Adjustment Factor which is 1.05.



TABLE NO. 2b
DOLLAR ADJUSTMENT FACTOR



EXAMPLE: The Dollar Adjustment Factor is desired for a \$2,500,000 renovation project.

$$\text{DOLLAR RELATIONSHIP: } \frac{\text{PROPOSED FACILITY}}{\text{TYPICAL FACILITY}} = \frac{\$2,500,000}{\$4,000,000} = 0.625$$

Find .625 on the horizontal axis. Trace a vertical line to the factor curve and then trace a horizontal line to the vertical axis' Adjustment Factor which is 1.05.



TABLE NO. 3
ALASKAN CONSTRUCTION ESCALATION INDEX
ANCHORAGE, ALASKA

APRIL 2016

Base Year 1980	Index 100.00	Increase From Previous Year	Base Year 1980	Index 100.00	Increase From Previous Year
1980	100.00	-	1999	150.96	1.84%
1981	104.40	4.40%	2000	152.60	1.64%
1982	107.70	3.30%	2001	154.53	1.93%
1983	115.60	7.90%	2002	162.54	8.01%
1984	118.60	3.00%	2003	166.34	3.80%
1985	117.70	-0.90%	2004	176.57	10.23%
1986	121.40	3.70%	2005	188.55	11.98%
1987	123.00	1.60%	2006	198.41	9.86%
1988	124.80	1.80%	2007	205.73	7.32%
1989	126.40	1.60%	2008	208.59	2.86%
1990	131.80	5.40%	2009	209.55	0.96%
1991	134.30	2.50%	2010	212.38	2.82%
1992	138.80	4.50%	2011	216.27	3.89%
1993	143.30	4.50%	2012	218.67	2.41%
1994	144.40	1.10%	2013	222.87	4.20%
1995	143.40	-1.00%	2014	223.78	0.91%
1996	146.20	2.80%	2015	228.32	4.54%
1997	146.70	0.50%	2016	227.49	-0.36%
1998	149.12	2.42%	2017	Estimated	1.25%

NOTES:

Back-up data for this analysis is held at HMS Inc., 4103 Minnesota Drive, Anchorage, Alaska.

These cost estimates are an index based on average costs for materials, freight and equipment, and also estimated Title 36 labor rates. The index is based on an institutional building in Anchorage using a standard AIA contract or similar contract.

Always remember that an index is only a useful guide and not necessarily correct for any specific need. It represents only a collection of costs normally found on some construction projects, rather than the custom requirements of a particular project.

Though the recent collapse in oil prices and resulting uncertainty in the state economy has held construction cost escalation to near zero, a continued gradual recovery in oil prices since the lows experienced in February 2016 would suggest a slight increase in construction cost escalation may be experienced in the upcoming year. It remains to be seen if the down turn in state funded projects resulting from the state budget reductions and uncertainly currently experienced as a result of legislative inability to come to a consensus on critical state budget issues as a result will create a competitive enough market to offset price escalation from the moderate recovery in oil prices anticipated.



TABLE NO. 3
ALASKAN CONSTRUCTION ESCALATION INDEX
ANCHORAGE, ALASKA

APRIL 2016

In addition, Alaska will see substantial increase in federal construction spending, particularly in central Alaska, beginning in Fiscal Year 2017 as a result of the construction of the F-35 Aircraft Support Infrastructure and continued spending in support of the missile defense system.

For planning purposes, HMS Inc. recommends a future rate of 1.25% escalation at this time with a possible increase up to 1.75% as the state budget reaches resolution, oil prices continues to recover, and federal spending continues to ramp up through 2020.



TABLE NO. 4

APPENDIX D - TYPE OF SPACE ADDED OR IMPROVED

Category A - Instructional or Resource

Kindergarten
 Elementary
 General Use Classrooms
 Secondary
 Library/Media Center
 Special Education
 Bi-Cultural/Bilingual
 Art
 Science
 Music/Drama
 Journalism
 Computer Lab/Technology Resource
 Business Education
 Home Economics
 Gifted/Talented
 Wood Shop
 General Shop
 Small Machine Repair Shop
 Darkroom
 Gym

Category B - Support Teaching

Counseling/Testing
 Teacher Workroom
 Teacher Offices
 Educational Resource Storage
 Time-out Room
 Parent Resource Room

Category C - General Support

Student Commons/Lunch Room
 Auditorium
 Pool
 Weight Room
 Multipurpose Room
 Boys Locker Room
 Girls Locker Room
 Administration
 Nurse
 Conference Rooms
 Community Schools/PTA Administration
 Kitchen/Food Service
 Student Store

Category D - Supplementary

Corridors/Vestibules/Entryways
 Stairs/Elevators
 Mechanical/Electrical
 Passageways/Chaseways
 Supply Storage & Receiving Areas
 Restrooms/Toilets
 Custodial
 Other Special Remote Location Factors
 Other Building Support



TABLE NO. 5

ABBREVIATIONS

\$	=	Dollars
SF	=	Square Foot
LF	=	Linear Foot
LS	=	Lump Sum
EA	=	Each
GAL	=	Gallons
CY	=	Cubic Yards
CR	=	Classroom



TABLE NO. 6

STATEMENT OF SPECIFICATIONS

Consideration for pricing of unit costs in the Program Demand Cost Model for Alaskan Schools is based on superior level of specifications generally applied to new construction throughout the state. The reason being is that these schools are subject to hard usage, by day for educational use housing a significant number of students, faculty, and support staff, at other times schools are also used by the communities for a variety of functions.

To place the standard of specifications used on Alaskan schools in every day words, it will be reasonable to say that the quality of materials, workmanship and equipment specified is well above residential facilities, above a standard office building, likely similar to an airport and a little lower than a medical center.

Since the early 1970s, Alaska has tried to consider future operations and maintenance cost impacts in the funding of new school programs in the hope that a better funded project would allow for a more economic facility in terms of Life Cycle Cost. For this reason, schools have been designed to a superior level of specification.

In recent years some significance has been placed on ecological concerns that are both earth friendly and long term cost savings.

CONCRETE:

Strength of concrete often is specified to a minimum of 4,000 psi.

MASONRY:

Many areas in Alaska are Seismic Zone 4. Design of masonry work calls for significant reinforcing and support.

METALS:

Many areas in Alaska are Seismic Zone 4. Design of structural elements have enhanced strength connections and cross bracings.

WOODS AND PLASTICS:

Rough carpentry lumber at a minimum No. 2 grade, plywood (structural I) and finish work to a good quality with plastic laminate finish.

Wood framed buildings are also designed for Seismic Zone 4.



TABLE NO. 6

STATEMENT OF SPECIFICATIONS

THERMAL AND MOISTURE PROTECTION:

Thermal insulation in walls, R-19 and R-30, and roof R-50. Roofing material EPDM or Klip-Rib metal, the building sealed with Tyvek air barrier and joint sealants. Siding material pricing has been adjusted to provide for the use of cementitious siding.

OPENINGS:

Superior quality doors, frames and hardware. Windows Low E and insulated.

FINISHES:

Standard school finishes. Gypboard walls, acoustical tile ceilings, carpet and vinyl flooring with ceramic tile in bathroom toilets. Rigid vinyl wall coverings at janitor closets and kitchens.

SPECIALTIES:

Higher quality toilet partitions and toilet accessories, painted metal lockers and comprehensive signage.

EQUIPMENT:

Superior quality kitchen equipment, stainless steel worktops, good quality sports equipment.

FURNISHINGS:

Plastic laminate finish to casework. Solid surface countertops. Window coverings and entry mats. Smart boards.

MECHANICAL:

Copper water piping, insulated cast iron waste, American Standard fixtures.

Weil McLane boilers, hydronic heating, air handling with some cooling and exhaust system with digital controls.

Fully sprinklered fire suppression system throughout the school.

ELECTRICAL:

Good quality switchgear, panels and transformers, copper wiring all in conduit backed up with a standby generator. Lighting with energy saving lamps (LED) and good quality devices. Fire alarm system and all low voltage system currently used in modern Alaskan schools.