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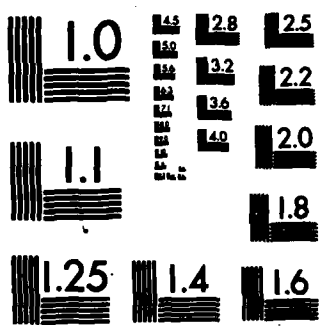

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HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT

AD-A142 943

ANNUAL REPORT

BRIAN M. BARRY

MARCH 1984

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

US ARMY AVIATION SYSTEMS COMMAND
DIRECTORATE FOR PLANS AND ANALYSIS
DATA ANALYSIS AND CONTROL DIVISION
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

a. This technical report is a continuation of previous efforts to develop the necessary rationale and methodology needed in order to construct historical inflation indices, in the Research and Development (R&D) area, relative to Army aircraft. The R&D historical indices, and the sub-indices from which they are derived, are presented in the appendices to this report for the period FY68 through FY83. These indices are appropriate for updating statistical reports that formerly utilized the OSD forecasting indices; for initial use in bringing a cost in prior years to a present-year dollar value; and for evaluating

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20. ABSTRACT (Continued).

inflation actually experienced. A computer program is utilized to make the necessary mathematical calculations.

b. Data sources for this report were the Office of Personnel Management (OPM) and the Bureau of Labor Statistics (BLS). OPM supplied data on government salaries. BLS furnished data on industry salaries and thirteen (13) different materials.

c. The computer program prints the R&D historical inflation indices and sub-indices by fiscal year as shown in Appendices C through G of this report.

HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT

BRIAN M. BARRY, ECONOMIST

MARCH 1984

US ARMY AVIATION SYSTEMS COMMAND
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TABLE OF CONTENTS

I. INTRODUCTION AND APPLICABILITY.

A. This report is the fifth revision to the AVRADCOM Historical Research and Development Inflation Indices for Army Fixed and Rotary Winged Aircraft.

B. The Labor/Material Mix is not the same for all R&D program categories. Four different inflation indices have been constructed representing the most common Labor/Material Mixes.

C. New materials and new applications for existing materials are being continually developed and tested. The Bureau of Labor Statistics' Producer Prices and Price Indexes (PPI) data currently used represents these new materials and applications with varying degrees of accuracy. Research and analysis in this area, which is designed to insure the application of the most appropriate PPIs, is continuing. Fortunately, the material portion in R&D is low and changes in the material mix will not seriously effect the overall accuracy of the indices. Current research effort is aimed at isolating the overhead component in the R&D indices which have already been constructed. Preliminary results indicate that each of the R&D category indices will increase at faster rates when an overhead component is added using an appropriate weighted component of the Consumer Price Index.

D. Although the major portion of the AVRADCOM R&D effort is directed toward rotary wing aircraft, these historical R&D indices may be used for light fixed wing aircraft, also.

E. This report summarizes the efforts to develop necessary methodology to construct historical R&D indices relative to the Army Aviation Research and Development Program. Appendices C through G were developed from computer printouts that were utilized for the computation of the actual indices to be applied.

F. These R&D historical indices are appropriate for updating statistical reports that formerly utilized the OSD forecasting indices; for initial use in brining a cost in prior years to a present-year dollar value; and for evaluating inflation actually experienced in Army Aviation Research and Development.

G. In conjunction with the historical inflation indices, AVRADCOM develops program unique inflation indices. These latter indices allow increased accuracy in tracking that portion of specific program's cost impacts which can be attributed to past inflation. In February 1981, for example, a program unique inflation index was developed for the Remotely Piloted Vehicle (RPV) Program. The RPV unique index is being used to accurately track inflation and was also made a part of the Baseline Cost Estimate (BCE) and Independent Cost Estimate (ICE). The R&D indices presented in this report, on the other hand, are intended for use by any or all Army avaition programs.

II. METHODOLOGY.

A. Labor Costs.

1. Neither clerical nor unskilled labor was costed for either Industry or Government. This should not effect the relative costs as these occupations are not involved in Research and Development (R&D) as much as Engineering.

2. The Industry Labor Index was compiled by using a percent of two engineering occupational categories in the Bureau of Labor Statistics' Annual Bulletin the National Survey of Professional, Administrative, Technical, and Clerical Pay, March 1983. The index for Engineers for the period 1982 to 1983 was multiplied by 0.90 and the index for the same period for Engineering Technicians was multiplied by 0.10.

3. The Government Labor Index was compiled by increasing the previous year's index by 3.5 percent (the 1983 pay increase).

4. Statistical analysis of the number of government and the number of contractual personnel engaged in Research and Development (R&D) indicates a ratio of 40 percent Government to 60 percent Contractual (Industry).

B. Material Costs:

1. A survey of Army aviation R&D activities was made to determine materials utilized. The list contained aluminum, nickel, titanium, cobalt, steel, copper and iron alloys; fiberglass, plastics, natural rubber, butyl rubber, neoprene, teflon, tungsten-carbide, polyurethane, epoxy resin, nomex, and kevlar.

2. This list of materials was then matched, as closely as possible, to a PPI series and weighted by the percent of total cost. Table 1 is the table used in the January 1982 historical inflation report as a listing of the above materials and weights. Table 2 is that from the March 1983 report. They are in this report for continuity.

C. Labor/Material Mix by RDT&E Program Category.

1. Generally speaking, the earlier the research in time, the less materials are required.

2. The Research and Technology Laboratory Headquarters at Moffett Field, California, has determined that a mix of 95 percent labor and 5 percent material is appropriate for 6.1/6.2 program categories.

3. Projects in the 6.3 program category have a mix of 90 percent labor and 10 percent material; and in the 6.4 program category, a mix of 85 percent labor and 15 percent material is normal.

4. Finally, an "Other" index is provided based on a mix of 75 percent labor and 25 percent material for those programs that produce a quantity of prototypes in the 6.4 program category.

5. If the use of only one index is desired, it is recommended that you use the index associated with the 6.4 RDTE program category, or, if more accuracy is desired, a weighted 6.1 thru 6.4 index can be calculated using the percentages of the total R&D expenditure of a similar system as the weights.

III. COMPARATIVE ANALYSIS.

A. The R&D index for 6.1/6.2 category increased 4 percent in FY83, down from 12.4 of a year earlier. Similarly, the 6.3 R&D index rose 4.1 percent in FY83 whereas in 1982 it had increased by 11.8 percent. Labor costs increased by the 4.6 percent from 1982 to 1983 in contrast to a 13.0 percent from 1981 to 1982. Material costs actually decreased by 1.0 percent from 1982 to 1983. The small increase in labor costs and the decrease in material costs explain the slight increase in all categories of R&D, (6.1/6.2, 6.3, 6.4, Other). The above historical inflation indices by R&D categories are presented in Appendix D.

B. In Appendix B one can observe modest increases and decreases in most of the commodity inflators. Table 4 organizes these inflators in terms of those which declined and those which increased. Part I lists the materials which experience a decrease in inflators from 1982 to 1983 in FY 1983 dollars. Each item's percent contribution to cost is listed, then the percent increase from 1982 to 1983 is presented and then the cumulative percent of contribution to cost is stated. Part II is similar in intent and format but demonstrates those materials which had inflators increase from 1982 to 1983. The most dramatic decrease was the decline in titanium, (13.6%). However, its impact on overall cost of material is minimal due to its weight of 2 percent contribution to cost. Cobalt also had a meaningful decrease in its inflator, (9.1%), but was also of minor impact due to its weighting as to contribution to cost, (40%).

C. Industry labor had a greater increase in the cost of labor than did government labor. Industry labor costs increased 5.4 percent while government labor costs increased 3.5 percent. The overall labor inflator increased 4.6 percent from 1982 to 1983.

D. Appendices A to C are intermediate steps to Appendix D. The labor inflator in Appendix D represents 40 percent of the government and 60 percent of the industry inflators in Appendix C. The material inflator in Appendix D is the sum of the commodity inflators times the respective weights in Appendix B.

IV. SUMMARY. This fifth revision to the AVRADCOM (AVSCOM) Historical Research and Development Inflation for Army Fixed and Rotary Winged Aircraft follows the same methodology used in the second revision dated January 1981. The assumptions and techniques remain the same.

Table 1

MATERIAL MIX THIRD REVISION

MATERIAL	PPI SERIES	PPI CODE	WEIGHTING FACTOR
Rubber	Rubber & Plastic Products	07	1%
Fiberglass	Rubber & Plastic Products	07	3%
Nomex	Paperboard, Container Board	09 14 01	10%
Steel Sheet, Flat	Steel Sheets, C.R., Carbon	10 13 02 62	12.5%
Steel Sheet, Stainless	Steel Sheets, C.R., Stainless	10 13 02 64	12.5%
Closed Die Forgings	Closed Die Forgings Alloy Steel	10 15 01 53	5%
Cobalt Alloy	Cobalt	10 22 01 05	4%
Aluminum Sheet	Aluminum Sheet, Flat 5052-H 32	10 25 01 01	13%
Aluminum Rod, Screw Machine Stock	Aluminum Rod, Screw Machine Stock, 2011-T3	10 25 01 13	3%
Aluminum Extrusion	Aluminum Extrusion, Solid, Circle Size, 4 to 5	10 25 01 17	10%
Copper	Copper & Brass Mill Shapes	10 25 02	1%
Nickel Alloy	Monel Sheet, CR 400 Alloy	10 25 04 63	23%
Titanium	Titanium Mill Shapes (From Dec 70)	10 25 05	2%
	Titanium Sponge (Before Dec 70)	10 22 01 56	

Table 2

MATERIAL MIX FOURTH REVISION

	PPI Code	PPI Series	Material Represented	Weight Factor
(1)	07	Rubber & Pastic Products	Rubber and Plastics	.01
(2)	07	Rubber & Plastic Products	Fiberglass	.03
(3)	091401 1/	Paperboard, Container Board	Nomex	.10
(4)	10170711 1/	Steel Sheets, Cold Roll, Carbon	Steel Sheet, Flat	.125
(5)	10170751	Steel Sheets, Cold Roll, Stainless	Steel Sheet, Stainless	.125
(6)	10150153	Closed Die Forgings Alloy Steel (prior to Oct 81)	Closed Die Forgings	.05
	10151351	Closed Die Forgings, Carbon Steel (after Oct 81)		
(7)	10220122 2/	Cobalt	Cobalt Alloy	.04
(8)	10250101	Aluminum Sheet, Flat 5052-H32	Aluminum Sheet	.13
(9)	10250113	Aluminum Rod, Screw Machine Stock (prior to Feb 82)	Aluminum Rod, Screw Machine Stock	.03
	10250147 3/	Aluminum Rod, Extruded (after Feb 82)		
(10)	10250117	Aluminum Extrusion, Solid Circle Size, 4 to 5 (prior to Dec 81)	Aluminum Extrusions	.10
	10250153 4/	Aluminum Extrusion, Solid Circle Size, 4 to 5 (after Dec 81)		
(11)	102502	Copper & Brass Mill Shapes	Copper	.01
(12)	10250463	Monel Sheet, CR400 Alloy	Nickel Alloy	.23
(13)	10220156	Titanium Sponge (before Dec 70)	Titanium	.02
	102505 5/	Titanium Mill Shapes (after Dec 70)		

FOOTNOTES: 1/ Only the PPI number changed. Base year of series remained the same.

2/ Cobalt PPI was not reported during the period from Oct 81 through Jan 82, due to instability in the cobalt market. Conversations with BLS commodity specialist for cobalt indicate that the price was falling constantly during this timeframe, before stabilizing in Feb 82. Values for the series were assumed to reflect this market condition.

3/ 10250113 was last reported in Jan 82. 10250147 was selected as the most appropriate substitute, adjustments were made to account for differences in base years for the two series.

4/ 10250117 was renumbered and rebased in January 1982. The 10250153 was adjusted by a 3.093 factor to account for the change in base year.

5/ Titanium Mill Shapes adjusted by .955 factor to give continuity with Titanium Sponge.

Table 3

MATERIAL MIX CURRENT REVISION

	PPI Code	PPI Series	Material Represented	Weight Factor
(1)	07	Rubber & Plastic Products	Rubber and Plastics	.01
(2)	07	Rubber & Plastic Products	Fiberglass	.03
(3)	091401	Paperboard	Nomex	.10
(4)	10170711.99	Steel Sheets, Cold Roll, Carbon	Steel Sheet, Flat	.125
(5)	10170751.99	Steel Sheets, Cold Roll, Stainless	Steel Sheet, Stainless	.125
(6)	10150153	Closed Die Forgings Alloy Steel (prior to Oct 81)	Closed Die Forgings	.05
	10151351.34	Closed Die Forgings, Carbon Steel (after Oct 81)		
(7)	10220122	Cobalt	Cobalt Alloy	.04
(8)	10250101.04	Aluminum Sheet, Flat 5052-H32	Aluminum Sheet	.13
(9)	10250113	Aluminum Rod, Screw Machine Stock (prior to Feb 82)	Aluminum Rod, Screw Machine Stock	.03
	10250147.99	Aluminum Rod, Extruded (after Feb 82)		
(10)	10250117	Aluminum Extrusion, Solid Circle Size, 4 to 5 (prior to Dec 81)	Aluminum Extrusions	.10
	10250153.99	Aluminum Extrusion, Solid Circle Size, 4 to 5 (after Dec 81)		
(11)	102502	Copper & Brass Mill Shapes	Copper	.01
(12)	10250463	Monel Sheet, CR400 Alloy	Nickel Alloy	.23
(13)	10220156	Titanium Sponge (before Dec 70)	Titanium	.02
	102505	Titanium Mill Shapes (after Dec 70)		

TABLE 4

DECREASES AND INCREASES IN MATERIAL COSTS

PART I MATERIAL	WEIGHT	PERCENT CHANGE	CUMULATIVE PERCENT OF COST
Nomex	.100	- 1.3	10.0
Stainless Steel	.125	- 5.4	22.5
Cobalt	.040	- 9.1	26.5
Alum. Sheet	.130	- 2.8	39.5
Alum. Rod	.030	- 1.0	42.5
Titanium	.020	-13.6	44.5

PART II MATERIAL	WEIGHT	PERCENT CHANGE	CUMULATIVE PERCENT OF COST
Steel Sheet, Flat	.125	+3.9	12.5
Alum. Extruded	.100	+2.4	22.5
Nickel Alloy	.230	+0.2	45.5
Rubber	.010	+1.1	46.5
Fiberglass	.030	+1.1	49.5
Close Forging	.050	+0.2	54.5
Copper	.010	+2.6	55.5

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VI. ACRONYMS.

AAH - Advanced Attack Helicopter

ACO - Administrative Contracting Officer

ASRO - Advanced Systems Research Office

ASTIO - Advanced Systems Technology and Integration Office - (AVRADCOM)

ATDE - Advanced Technology Demonstrator Engine

AVRADCOM - US Army Aviation Research and Development Command

BLS - Bureau of Labor Statistics - (Department of Labor)

CCDR - Contractor Cost Data Reporting

CEIS - Cost and Economic Information System

CIR - Cost Information Report

CY - Calendar Year

DCAA - Defense Contract Audit Agency

DCAS - Defense Contract Administration Service

DT - Development Test

DTUPC - Design to Unit Production Cost

ED - Engineering Development

ERADCOM - US Army Electronics Research and Development Command

EW - Empty Weight

FY - Fiscal Year

G&A - General and Administrative

GNP - Gross National Product

IR - Infrared

IR&D - Independent Research and Development

LAMPS - Light Airborne Multipurpose System

MLH - Medium Lift Helicopter

MTBR - Mean Time Between Removals

OSD - Office of the Secretary of Defense

PM - Project Manager; Product Manager

PPI - Producer Price Index (formerly Wholesale Price Index)

RDT&E - Research, Development, Text and Evaluation

SHP - Shaft Horsepower

SIC - Standard Industrial Commodity

STAGG - Small Turbine Advanced Gas Generator

TSARCOM - US Army Troop Support and Aviation Materiel Readiness Command

V/STOL - Vertical/Short Takeoff and Landing

WPI - Wholesale Price Index (now Producer Price Index)

VII. DEFINITIONS.

Appropriation Pattern:	The time-phased plan of a program's calendar year buys. (An Army-pattern usually covers a five (5) year period.) (Source: PRIMIR Guide from DARCOM, 1967.
Base Year:	Period (e.g., fiscal year) selected as a reference for derivation of index numbers or escalation factors.
Constant Year Dollars:	Always associated with a base year (e.g., FY 72 constant dollars). An estimate is said to be in constant dollars if costs for all work are adjusted so that they reflect the level of prices of the base year. When prior or future costs are stated in constant dollars, the figures given are adjusted to presume that the buying power of the dollar was the same and will continue to remain the same as the base year. (DOD Economic Analysis Handbook.)
Current Year or "Then Year" Dollars:	Current to the year the work is performed. When prior costs are stated in current year dollars, the figures given are the actual amounts paid out. When future costs are stated in current year dollars, the figures given are the actual amounts which will be paid including any amount due to future price changes. When making future estimates, it is necessary to initially assume a base buying power for each dollar (constant dollars) and then apply an escalating factor for inflation which converts our estimate into current year dollars. The "current year" in "current year dollars" does not refer to the year in which the estimate is made or any other single year. (Source: TARADCOM Economic Analysis Handbook.)
Deflator:	A special case of an index. Used to convert current year dollars to the equivalent value of a given base year. (Source: TARADCOM/TARCOM Inflation/Price Escalation Instructions, DRDTA-VC, Jan 78.)
Escalated Costs: (Inflated Costs)	Dollars adjusted by a price escalation factor or a price level index.

Expenditure Profile: (Outlay Rate)	The time-phased estimate of a program's actual annual expenditures. Term may be applied to the expenditure of a given year's appropriation over time. (Source: TARADCOM/TARCOM Inflation/ Price Escalation Instructions, DRDTA-VC, Jan 78.)
Factor:	A price or cost relative derived from an index for the purpose of escalating or de-escalating costs (base year factor - 1.00).
Index:	A numerical procedure for tracking cost changes over time. (Source: Technical Report No. 77-1. "An Introduction to Basic Theory and Their Application, with Sample Problems, "U.S. Army TSARCOM, Oct 77.)
Inflator:	An index used to convert given base year dollars to the equivalent value of a current year. (Source: USAF, Aeronautical Cost Indices, May 77.)
Price Escalation Factor: (Inflation Index)	A number which converts prior year actual prices to base year prices through use of a price level index.
TOA:	Total Obligation Authority. (Source: AR 310-50, Nov 75, pg 74.)
Unescalated Costs:	Constant dollars unadjusted by a price escalation factor or a price level index.
Weighted Index:	An index reflecting the impact of an expenditure profile. (Source: USAF, Aeronautical cost indices, May 77.)
6.1 Research	Research includes all effort directed toward increased knowledge of natural phenomena and of the environment. The primary aim is to gain fuller knowledge and/or understanding of the hard sciences for example, physics, chemistry, biomedicine, engineering, and mathematics. It does not include the solving of behavioral and social science problems that have a clear direct military application, nor does it include the solving of human relations and factors which occur in conjunction with human use and acceptance in a man/group application to equipment, materiel, and/or systems. Research efforts result in an increased knowledge of natural phenomena and/or improved technology.

6.2 Exploratory Development	Exploratory development includes all effort directed toward solving specific military problems short of major developments projects. It may vary from fairly fundamental applied research to quite sophisticated prototype hardware, study, programming, and planning efforts. It would thus include studies and minor development efforts. The dominant characteristic is that the effort is pointed toward specific military problem areas with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters.
6.3 Advanced Development	Advanced development includes all projects that have progressed to developing hardware for experimental or operational test. It is characterized by line item project, and program control is exercised on a project basis. Another descriptive characteristic is the design of the items being directed toward hardware for test or experimentation as opposed to items designed and engineered for eventual military service use.
6.4 Engineering Development	Engineering development includes those development projects being engineered for military service use but which have not yet been approved for procurement or operation. It is characterized by major line item projects; program control is exercised by reviewing individual projects.

(Source: Army Aviation RDT&E Plan, US Army Research and Technology Laboratories, Ames Research Center, Moffett, Field, CA, October 1977.)

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APPENDIX A

COMMODITY SUB-INDEXES
1968 = 1.0000

FISCAL YEAR	RUBBER .01	FIBER-GLASS .03	NOMEX .10	FLT SHT STEEL .125	STAIN LESS ST .125	CLOSE FORGINGS .05	COBALT ALLOY .04	ALUM SHEET .13	ALUM ROD .03	ALUM EXTRU .10	COPPER .01	NICKEL ALLOY .23	TITAN-IUM .02
1968	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1969	1.0206	1.0206	0.9812	1.0482	1.0275	1.0347	1.0000	1.0609	0.9022	1.0678	0.9879	1.0476	0.9940
1970	1.0500	1.0500	1.0354	1.1072	1.2216	1.1179	1.1170	1.1006	0.9271	1.1645	1.2149	1.1883	0.9629
1971	1.0687	1.0687	1.0302	1.1740	1.2892	1.1863	1.1890	1.0827	0.9321	1.2134	1.1330	1.3214	0.9669
1972	1.0716	1.0716	1.0604	1.2793	1.3373	1.2616	1.2560	1.0548	0.9331	1.2154	1.1312	1.3631	1.0060
1973	1.0915	1.0315	1.1240	1.3225	1.1647	1.3221	1.4230	1.0378	0.9321	1.2373	1.2112	1.3932	1.0281
1974	1.1806	1.1806	1.2750	1.3933	1.3000	1.4202	1.7250	1.1414	1.0220	1.3270	1.5414	1.4951	1.1052
1975	1.4475	1.4475	1.7479	1.8456	1.6833	1.7988	2.0830	1.4980	1.4202	1.6241	1.5507	1.9816	1.4870
1976	1.5034	1.5034	1.8042	1.9174	1.5902	1.9930	2.1980	1.5886	1.4790	1.7069	1.4233	2.2379	1.6443
1977	1.5810	1.5810	1.8646	2.0560	1.6824	2.1824	2.4690	1.8078	1.5569	1.8833	1.5898	2.3447	1.6443
1977	1.6310	1.6310	1.8094	2.2016	1.8716	2.2944	2.8880	1.9512	1.6098	2.0528	1.5684	2.4641	1.6353
1979	1.6928	1.6928	1.7667	2.4533	1.9392	2.5421	4.2050	2.2420	1.7126	2.2662	1.5535	2.5495	1.6403
1979	1.8440	1.8440	1.9875	2.7109	2.0833	2.8622	12.5240	2.4442	1.8603	2.4576	1.8958	2.8757	1.8637
1990	2.0864	2.0864	2.3906	2.8800	2.2765	3.2636	13.5150	2.4502	2.0210	2.8026	2.1544	3.7359	2.5872
1981	2.2581	2.2571	2.5812	3.1009	2.2304	3.6165	11.9380	2.7161	2.1996	3.0628	2.0781	3.6563	3.3046
1982	2.3602	2.3602	2.6146	3.3776	2.3627	3.9425	7.4330	2.9442	2.2246	3.0778	1.9563	3.6563	3.6022
1983	2.3849	2.3849	2.5806	3.5088	2.2364	3.9519	6.7570	2.8603	2.2121	3.1507	2.0067	3.6650	3.1115

APPENDIX B

COMMODITY INFLATORS
1983 = 1.0000

FISCAL YEAR	RUBBER .01	FIBER-CLASS .03	NOMEX .10	FLT SHT STEEL .125	STAIN LESS ST .125	CLOSE FORGINGS .05	COBALT ALLOY .04	ALUM SHEET .13	ALUM ROD .03	ALUM EXTRU .10	COPPER .01	NICKEL ALLOY .23	TITANIUM .02
1968	2.3949	2.3849	2.5806	3.5088	2.2364	3.9519	6.7570	2.8603	2.2121	3.1507	2.0067	3.6650	3.1115
1969	2.3369	2.3368	2.6300	3.3475	2.1767	3.8194	6.7570	2.6965	2.4519	2.9507	2.0312	3.4986	3.1303
1970	2.2713	2.2713	2.4924	3.1691	1.8308	3.5350	6.0492	2.5989	2.3859	2.7056	1.6517	3.0842	3.2313
1971	2.2316	2.2316	2.5050	2.9886	1.7347	3.3312	5.6829	2.6419	2.3731	2.5967	1.7711	2.7737	3.2179
1972	2.2255	2.2255	2.4336	2.7428	1.6724	3.1324	5.3798	2.7118	2.3706	2.5924	1.7740	2.6897	3.0929
1973	2.2053	2.2053	2.2960	2.6531	1.9202	2.9891	4.7484	2.7560	2.3731	2.5465	1.6569	2.6307	3.0266
1974	2.0202	2.0202	2.0240	2.5183	1.7203	2.7826	3.9171	2.5059	2.1645	2.3743	1.3018	2.4513	2.8153
1975	1.6476	1.6476	1.4764	1.9011	1.3286	2.1970	3.2439	1.9094	1.5576	1.9399	1.2940	1.8476	2.0925
1976	1.5863	1.5863	1.4304	1.8300	1.4064	1.9779	3.0742	1.8005	1.4956	1.8459	1.4059	1.6377	1.8923
1977	1.5085	1.5085	1.3840	1.7066	1.3294	1.8109	2.7367	1.5805	1.4208	1.6729	1.2622	1.5631	1.8923
1978	1.4622	1.4622	1.4263	1.5938	1.1950	1.7225	2.3397	1.4659	1.3741	1.5348	1.2295	1.4874	1.9027
1979	1.4083	1.4098	1.4607	1.4302	1.1533	1.5546	1.6069	1.2758	1.2917	1.3903	1.2917	1.4375	1.8969
1980	1.2934	1.2934	1.2984	1.2943	1.0735	1.3307	0.5395	1.1702	1.1891	1.2820	1.0585	1.2745	1.6695
1981	1.1431	1.1431	1.0795	1.2183	0.9824	1.2109	0.5000	1.1674	1.0946	1.1242	0.9314	0.9810	1.2027
1982	1.0562	1.0566	0.9998	1.1031	1.0027	1.0928	0.5660	1.0531	1.0057	1.0287	0.9656	1.0024	0.9416
1983	1.0105	1.0105	0.9870	1.0388	0.9465	1.0024	0.9091	0.9715	0.9944	1.0237	1.0258	1.0024	0.8638
1984	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

APPENDIX C

FISCAL YEAR	LABOR INDICES 1968 = 1.0200 GOVERNMENT	LABOR INDICES 1968 = 1.0200 INDUSTRY	LABOR INFLATORS 1983 =1.0000 GOVERNMENT	LABOR INFLATORS 1983 =1.0000 INDUSTRY
1968	1.0000	1.0000	2.5145	2.9299
1969	1.0600	1.0576	2.3723	2.7702
1970	1.1915	1.1220	2.1104	2.6113
1971	1.2631	1.1960	1.9908	2.4498
1972	1.3356	1.2651	1.8827	2.3159
1973	1.4246	1.3333	1.7651	2.1974
1974	1.4932	1.4150	1.6839	2.0706
1975	1.5725	1.5255	1.5990	1.9207
1976	1.6528	1.6340	1.5214	1.7931
1977	1.6731	1.6599	1.5029	1.7650
1978	1.7592	1.7771	1.4294	1.6486
1979	1.8830	1.9251	1.3354	1.5220
1980	1.9655	2.0730	1.2664	1.4133
1981	2.1248	2.2786	1.1834	1.2858
1982	2.3182	2.5235	1.0847	1.1601
1983	2.4294	2.7810	1.0350	1.0535
	2.5145	2.9299	1.0000	1.0000

APPENDIX D

HISTORICAL INFLATION INDICES

FISCAL YEAR	INFLATORS		6.1/6.2	6.3	6.4	OTHER
	LABOR	MATERIAL	.95 LABOR .05 MATERIAL	.90 LABOR .10 MATERIAL	.85 LABOR .15 MATERIAL	.75 LABOR .25 MATERIAL
1968	2.7637	3.2180	2.7864	2.8092	2.8319	2.8773
1969	2.6110	3.1150	2.6362	2.6614	2.6866	2.7370
1970	2.4109	2.8543	2.4331	2.4553	2.4774	2.5218
1971	2.2662	2.7184	2.2888	2.3114	2.3340	2.3792
1972	2.1426	2.6370	2.1673	2.1920	2.2168	2.2662
1973	2.0245	2.5951	2.0530	2.0815	2.1101	2.1671
1974	1.9159	2.3701	1.9386	1.9614	1.9841	2.0295
1975	1.7920	1.8260	1.7937	1.7954	1.7971	1.8005
1976	1.6844	1.7250	1.6864	1.6884	1.6905	1.6945
1977	1.6602	1.6036	1.6574	1.6545	1.6517	1.6460
1977	1.5609	1.5076	1.5583	1.5556	1.5529	1.5476
1978	1.4473	1.3925	1.4446	1.4418	1.4391	1.4336
1979	1.3546	1.2213	1.3479	1.3413	1.3346	1.3213
1980	1.2447	1.0653	1.2359	1.2269	1.2179	1.2000
1981	1.1320	1.0117	1.1240	1.1181	1.1122	1.1004
1982	1.0461	0.9904	1.0433	1.0406	1.0378	1.0322
1983	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

END

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