

United States
Department of
Agriculture
Forest Service
Forest
Products
Laboratory
Resource
Bulletin
FPL- 8
March 1980

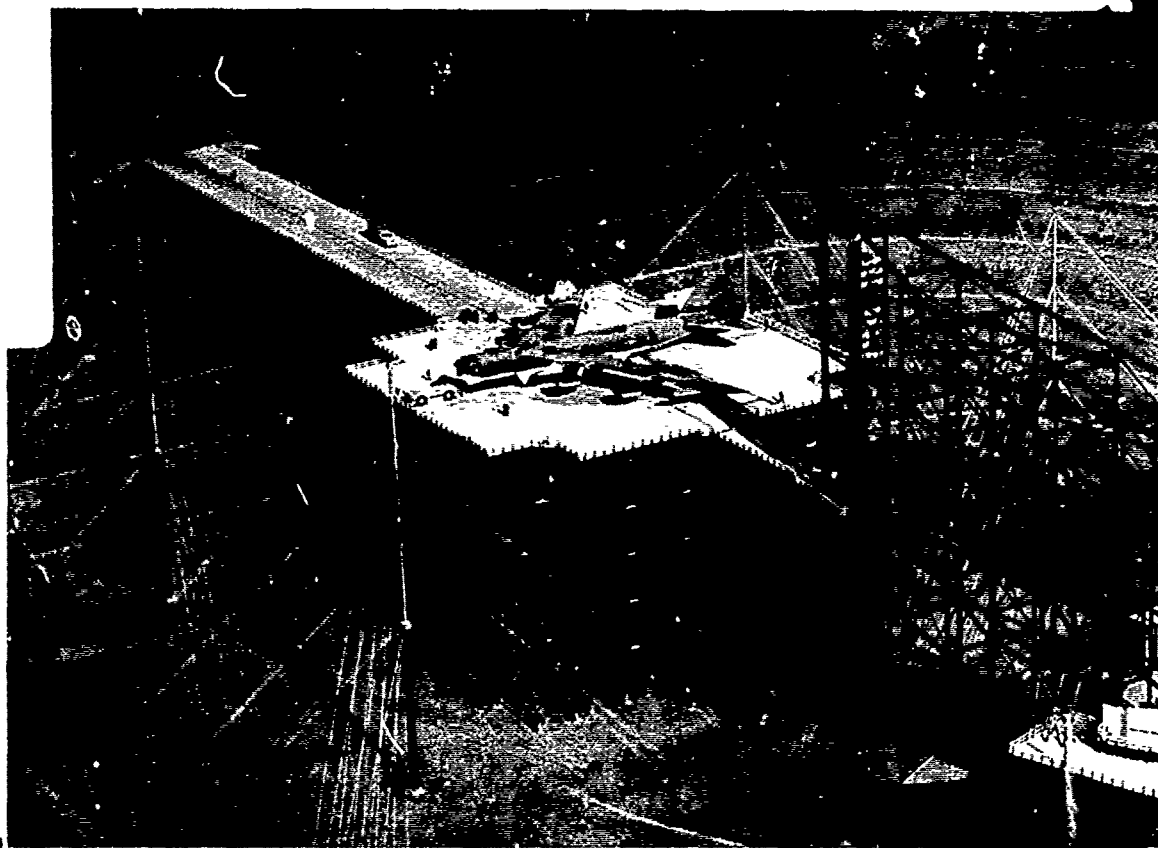
LEVEL III

Wood Products Used in Military Construction in the United States — 1962 and 1978

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ABSTRACT

This study presents estimates of the amounts of wood products used in military construction in the United States for the years 1962 and 1978. Amounts of products used are stratified by 13 types of military facilities and 3 types of construction uses. Estimates of the amounts of wood products used in civil (conservation and development) projects will be presented in a companion report.

COVER

The illustrated structure, not included in the sample because of its uniqueness, is known as the Trestle Project. It is the world's largest glued-laminated wood structure, made up of 6.5 million board feet of laminated lumber. It is being constructed on Kirtland Air Force Base, New Mexico, with an early 1980 completion date at a cost of approximately 60 million dollars. It will be used to support tethered military aircraft during simulation tests of the effects on the aircraft's electronic system of electromagnetic pulses of the types generated by nuclear blasts.

This unique structure is located in a 125-foot deep excavated "bowl" and rises 125 feet to support a 51 by 386-foot ramp and a 200-foot square platform, upon which the aircraft to be tested are tethered. Enclosing the trestle is grounded wire mesh anchored at wood towers. Laminated beams are preservative-treated Douglas-fir and are fastened together with resin-impregnated, laminated beech wood bolts and nuts, using a steel split ring connector at each joint.

HIGHLIGHTS

Expenditures for military construction in the United States (in current dollars) generally declined from 1955 to 1967 and have generally increased since 1967. However, expenditures for military construction in constant (1972) dollars have generally declined since 1955 (table 1, fig. 1). These expenditures are for a variety of facility types (appendix) designed to meet the requirements at military installations of the Army, Navy, Air Force, and Reserve Forces.

During 1962 and 1978, over one-half the expenditures for military construction were for operational, maintenance, and research and development facilities (table 2, fig. 2). Approximately one-third of the lumber and one-half of the plywood used in military construction was used for these three facility types.

Total wood products use during 1978 was considerably less than during 1962. Lumber, plywood, and hardboard use between these two periods decreased at an average annual rate of more than 7 percent. The greatest decrease was in the use of lumber and plywood as a facilitating material (i.e., temporary construction uses, such as supports in the forming of concrete). Facilitating uses decreased at an average annual rate of 10 percent between 1962 and 1978.

Between 1962 and 1978 the use of lumber, plywood, and hardboard per \$1,000 of construction expenditure decreased at an annual rate of approximately 8 percent in current, and 2 percent in constant (1972) dollars. The use of poles and piling was an exception in this trend, increasing at an annual rate of 4 percent in constant dollars.

ACKNOWLEDGEMENT

Appreciation is expressed to personnel of the Corps of Engineers in Washington, D.C., and District offices for authorizing, during 1963 and 1978, Forest Service personnel to examine records of the amounts of wood products required in constructing both civil and military projects.

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Wood Products Used in Military Construction in the United States— 1962 and 1978.

By
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and
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9) Forest Service
Resource Bulletin

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INTRODUCTION

Substantial quantities of lumber, poles and piling, plywood, particleboard, insulation board, and hardboard are used in constructing military facilities² in the United States. A survey, as reported here, was made to estimate these quantities for 1962 and 1978. Consequently, comparisons of change were determined. Use of these materials was estimated by type of facility (operational, maintenance, training, research and development, warehouse and storage, administration, enlisted quarters, officers' quarters, community, sewage treatment and disposal, water supply and distribution, electrical—source and distribution, and docks and piers) and by type of use (structural, millwork, and facilitating).

Factors of wood used are shown per \$1,000 of construction value in both current and constant (1972) dollars. Constant dollars are used in order to provide a more uniform base for comparing 1962 and 1978 wood products use factors.

PROCEDURE

Wood products used in constructing military facilities in 1962 and 1978 were determined by surveying District Corps of Engineers' estimates of fair and reasonable costs and materials to construct military projects. Projects selected were those that had been recently completed or were under construction at the time of the surveys. Industrial plants, hospitals, family housing, and overseas construction were not included in the survey because they were placed in separate categories by the Bureau of the Census' report of new construction put in place.

The 1962 sample of military construction consisted of 151 projects with a construction value of over 94 million dollars, while the 1978 sample consisted of 186 projects with a construction value of over 422 million dollars (table 3). These projects were selected at the following district offices: New York, NY; Baltimore, MD; Norfolk, VA; Savannah, GA; Mobile, AL; Fort Worth, TX; Sacramento, CA; Omaha, NB; and Kansas City, KA.

Projects were selected at each district office, usually from a listing of projects either under construction or recently completed, in order to assure a representative sample of the construction types. Data collected from the Corps of Engineers' material estimates included the amounts of wood products (i.e., lumber, poles and pilings, plywood, particleboard, insulation board, and hardboard) consumed and type of use (i.e., structural, millwork, and facilitating). In addition, the accepted bid price for each project was obtained, and increased by 12 percent to account for planning, engineering, and architecture costs. The resulting amount was designated as construction value. Wood products use was determined per \$1,000 of construction value for each type of construction facility.

The percentage of expenditures made to construct each type of military facility during 1962 was determined from the construction status reports prepared by the U.S. Army, Air

¹ Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

² Does not include industrial plant, hospital, family housing, or overseas construction.

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Table 1.—Value of new military construction put in place in the United States, 1955-1978

Year	Million dollars	
	Current	Constant (1972)
1955	1,287	2,365
1956	1,360	2,294
1957	1,287	2,089
1958	1,402	2,304
1959	1,465	2,431
1960	1,366	2,301
1961	1,371	2,295
1962	1,266	2,075
1963	1,179	1,899
1964	910	1,447
1965	830	1,282
1966	727	1,077
1967	695	996
1968	808	1,101
1969	879	1,111
1970	718	834
1971	901	967
1972	1,087	1,109
1973	1,166	1,086
1974	1,185	905
1975	1,389	992
1976	1,520	1,074
1977	1,517	1,011
1978	1,450	900

Source: 1955 to 1972, U.S. Bureau of the Census, Construction Reports, Series C30-745, "Value of New Construction Put in Place, 1947-1977" U.S. G.P.O., Washington, D.C., 1975.

1973 to 1978, U.S. Department of Commerce, "Construction Review," Vol. 24, No. 5, Aug./Sept. 1978.

Force, and Bureau of Yards and Docks. These percentage estimates were used as indicators of construction activity and applied to the value of military construction put in place in both current and constant (1972) dollars, as reported by the Bureau of Census (table 2). Similarly, percentage of type of facility constructed during 1978 was determined from military construction authorized during fiscal 1978 and 1979 by the 95th Congress, First Session, Senate Reports 95-125 and 95-847.

Wood products use per \$1,000 of construction value in current dollars, as determined for each facility in the sample, was applied to the current dollar value of military construction put in place, by facility, to estimate the amounts of wood products used. Wood products use per \$1,000 of construction value in constant (1972) dollars is the ratio of wood products use by facility, as previously determined, to construction expenditures in constant dollars.

WOOD PRODUCTS USE

There was a decline between 1962 and 1978 in total lumber and plywood use and use per \$1,000 of construction expenditure (tables 4, 5, and 6, figs. 3 and 4). The use of lumber and plywood for facilitating purposes (i.e., temporary use of wood products in construction such as use in the forming of concrete) decreased the most

during the study period. About 2-1/2 times as much lumber per constant dollar of construction expenditure was used for facilitating purposes in 1962 as compared to 1978, and plywood use per constant dollar in 1962 was twice that of 1978.

Certain technological changes in the construction industry between 1962 and 1978 have contributed to a decreased demand for wood products. For example, the use of resin-coated or impregnated plywood for concrete formwork increases many fold the number of pours obtainable over untreated plywood, with additional pours being possible when the plywood is supported by metal or patented frames and fastening devices. These metal frames and mechanical fasteners minimize the use of supporting lumber and allow for erection and removal of forms with minimum damage to plywood.

In contrast, lumber and plywood use for structural purposes in military construction increased both in percentage of total use and in use per constant dollar of construction expenditure between 1962 and 1978. Structural use of lumber during 1962 accounted for approximately 30 percent of the total used in military construction, while in 1978 this use had increased to 55 percent. During this period, the use of lumber per \$1,000 (constant) of construction expenditure increased from 8.9 board feet in 1962 to 12.8 board feet in 1978. Plywood used for structural purposes during 1962 accounted for about 10 percent of the total plywood used in military construction, during 1978 about 30 percent of the plywood used was for this purpose. The use of plywood per \$1,000 (constant) of construction expenditure increased from 1.9 square feet (3/8-inch basis) to 3.0 square feet in 1978.

Lumber

In 1962, 69 million board feet of lumber were used in constructing military projects in the United States (table 4, fig. 5). This was approximately 0.2 percent of the total U.S. lumber consumption in 1962 and 1.6 percent of new nonresidential construction. Lumber use dropped an average of 7 percent annually from 1962 to 1978 when 21 million board feet were used in military construction. This represents 0.05 percent of total U.S. lumber consumption for that year. The greatest decrease in wood use

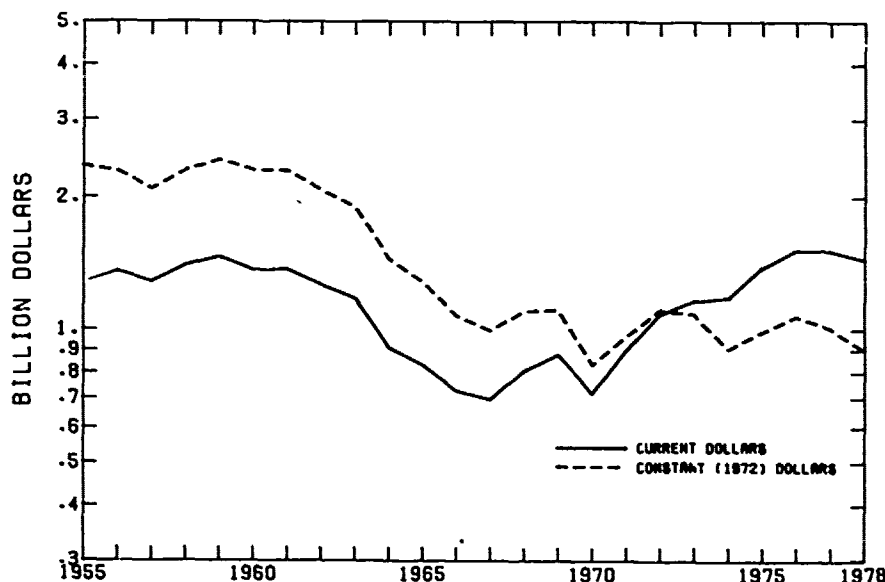


Figure 1.—Value of military construction put in place in current and constant (1972) dollars in the United States, 1955 to 1978.

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was for facilitating uses and amounted to 10 percent annually. Lumber used for facilitating purposes during 1962 amounted to 70 percent of the total used in military construction, but during 1978 only 40 percent of the total use was for this purpose.

During 1962, over 70 percent of the total lumber used was in constructing five types of facilities:

- (1) Operational
- (2) Maintenance
- (3) Research and development
- (4) Enlisted quarters
- (5) Officers' quarters

There was a shift by 1978 in the major types of facilities using lumber. The five that accounted for 80 percent of the lumber used were:

- (1) Operational
- (2) Training
- (3) Research and development
- (4) Warehouses and storage
- (5) Docks and piers

Total lumber use per \$1,000 of construction value between 1962 and 1978 decreased at an annual rate of 8.0 percent in current dollars and 2.2 percent in constant (1972) dollars. Lumber use in constant dollars was 33.31 board feet per \$1,000 in 1962 and 23.35 board feet in 1978 (table 5, fig. 4). The use of lumber for facilitating purposes decreased from 23.21 board feet per \$1,000 of construction expenditure in 1962 to 9.40 board feet in 1978, while the use of lumber for structural purposes during these years increased from 8.90 to 12.82 board feet (fig. 6).

Operational, training, and docks and piers are three types of facilities that either increased or showed little change in the use of lumber per \$1,000 of construction expenditure between the two study periods. All other facility types decreased in use.

Poles and Piling

The total quantity of poles and piling used in military construction was 1.05 million linear feet during 1962 and 0.88 million during 1978 (table 4). Using a conversion factor of 6.3 board feet per linear foot,³ the 1962 pole and piling use was equivalent to 6.59 million board feet and the 1978 use was 5.56 million board feet (fig. 5). The use of poles and piling in con-

Table 2.—Value of military construction put in place by type of facility in percent, current, and constant (1972) dollars in the United States, 1962 and 1978

Type of facility	1962			1978		
	Percent	Million dollars		Percent	Million dollars	
		Current	Constant (1972)		Current	Constant (1972)
Operational	25	316.5	518.7	13	188.5	117.0
Maintenance	16	202.6	332.0	18	216.0	162.0
Training	7	88.6	145.2	10	145.0	90.0
Research and development	18	227.9	373.5	20	290.0	180.0
Warehouse and storage	4	50.6	83.0	9	130.5	81.0
Administration	4	50.6	83.0	2	29.0	18.0
Enlisted quarters	10	126.6	207.5	6	87.0	54.0
Officers' quarters	2	25.3	41.5	1	14.5	9.0
Community	2	25.3	41.5	5	72.5	45.0
Sewage, waste treatment—disposal	2	25.3	41.5	6	87.0	54.0
Water supply and distribution	1	12.7	20.7	2	29.0	18.0
Electrical-heating source and distribution	7	88.6	145.2	5	72.5	45.0
Docks and piers	2	25.3	41.5	3	43.5	27.0
Total	100	1,266.0	2,075.0	100	1,450.0	900.0

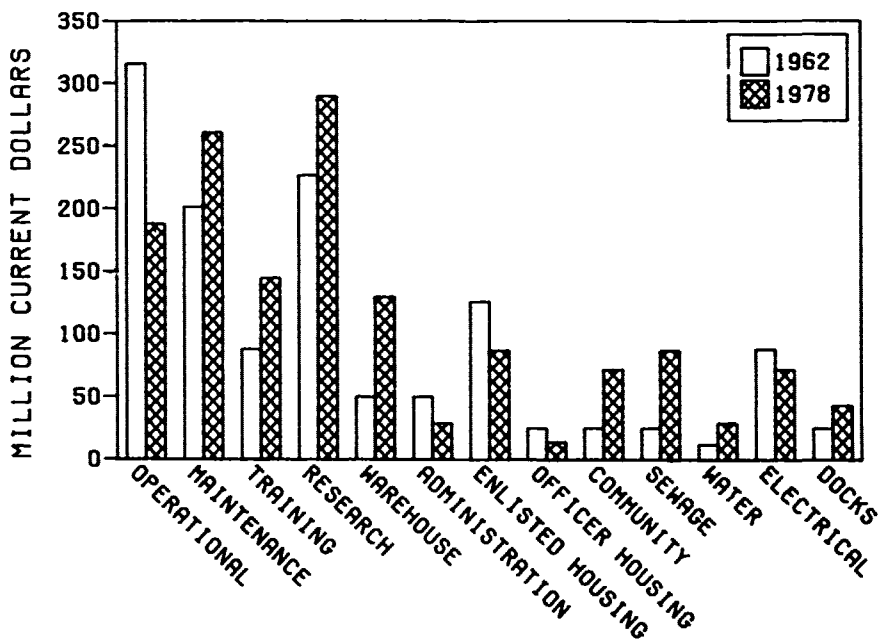


Figure 2.—Values of military construction put in place by type of facility in the United States, 1962 and 1978.

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Table 3.—Number and construction value of military projects sampled by type of facility in the United States, 1962 and 1978

Type of facility	1962		1978	
	Number in sample	Construction value (\$1,000)	Number in sample	Construction value (\$1,000)
Operational	12	3,122.0	20	9,063.8
Maintenance	22	9,606.0	21	37,026.4
Training	19	13,205.5	32	52,297.4
Research and development	10	12,918.4	9	19,803.3
Warehouse and storage	11	3,187.2	13	17,547.2
Administration	16	8,075.0	10	46,739.3
Enlisted quarters	12	14,744.0	17	107,672.2
Officers' quarters	5	3,176.8	7	14,307.3
Community	9	7,719.6	13	55,190.2
Sewage, waste treatment—disposal	8	4,295.5	25	37,850.7
Water supply and distribution	6	1,674.7	5	1,375.5
Electrical-heating source and distribution	14	10,691.0	11	21,322.1
Docks and piers	7	2,406.1	3	1,970.8
Total	151	94,816.8	186	422,166.2

structing docks and piers accounts for approximately 50 percent of the total used in military construction.

Pole and piling use in all facilities per \$1,000 of construction expenditure between 1962 and 1978 decreased at an annual rate of 2 percent in current dollars and increased at an annual rate of 4 percent in constant (1972) dollars. The use of these products in constant dollars was 0.51 linear feet in 1962 and 0.98 linear feet in 1978 (table 5, fig. 6).

The amount of poles and piling used in constructing docks and piers per \$1,000 of construction expenditure exceeded all other facilities. The use was 11.82 linear feet during 1962 and 19.05 linear feet during 1978. None of the other facilities exceeded 1.5 linear feet per \$1,000 of construction expenditure.

Plywood

Plywood used in military construction totaled 35.1 million square feet (3/8-inch basis) during 1962 and 10.0

¹ Conversion factor obtained from: Reid, William H. and David B. McKeever. 1978. Wood products and other materials used in constructing highways in the United States. USDA For. Ser., For. Prod. Lab., Resour. Bull. FPL-5, p. 3-4.

and millwork increased from 2.55 square feet to 4.18 square feet.

Operational, training, and electrical facilities were higher in plywood use per \$1,000 of construction value during 1978 than during 1962.

Particleboard, Insulation Board, and Hardboard

Relatively small quantities of particleboard and insulation board were used in military construction. They were unevenly dispersed among different types of facilities and years of study. Particleboard, a relatively new product, was not found to be used in military construction during 1962, and insulation board was used in only two facility types during 1962 and 1978 (table 4).

Hardboard used in military construction amounted to 726.8 thousand square feet (1/8-inch basis) in 1962 and 209.0 thousand square feet in 1978 (table 4). During 1962 approximately three-fourths of the hardboard was used in constructing operational, and research and development facilities, however, during 1978 this proportion was used in enlisted quarters.

The use of hardboard during 1962 and 1978 per \$1,000 of construction expenditure follows a trend similar to that found in lumber and plywood usage in both current and constant dollars (table 6).

million square feet during 1978 (table 4, fig. 5). This represents 2.1 and 0.5 percent of total U.S. plywood consumption for new nonresidential construction, respectively. The use of plywood for facilitating purposes accounted for 85 percent of the total amount used by the military during 1962 and 62 percent during 1978. Two-thirds of the plywood used during the study periods were in the following types of facilities:

- (1) Operational
- (2) Maintenance
- (3) Research and development
- (4) Enlisted quarters

Plywood use per \$1,000 of construction expenditure between 1962 and 1978 decreased at an annual rate of 8.4 percent in current dollars and 2.6 percent in constant (1972) dollars. Plywood use in constant dollars was 16.92 square feet during 1962 and 11.06 square feet during 1978 (table 5, fig. 6). The use of plywood for facilitating purposes decreased from 14.36 square feet per \$1,000 of construction value during 1962 to 6.88 square feet during 1978, while struc-

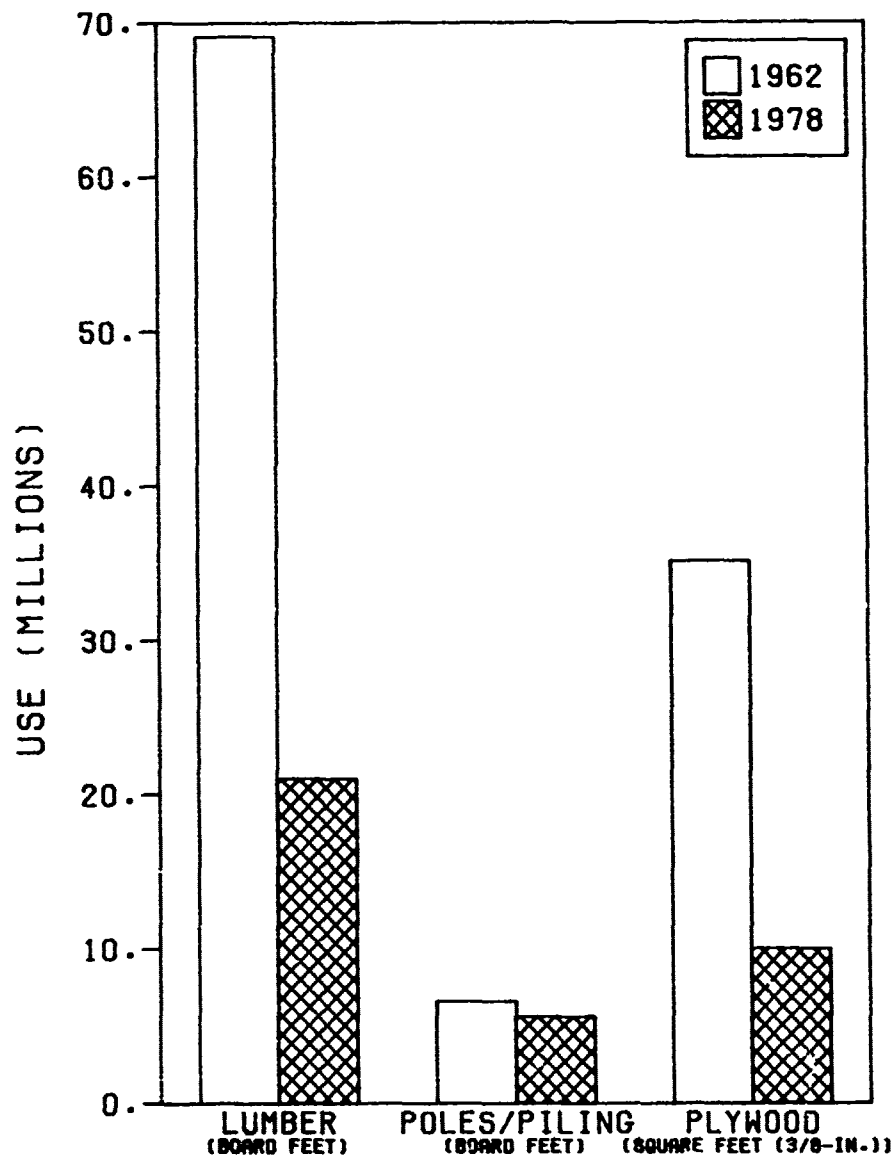


Figure 3.—Lumber, poles and piling, and plywood used in military construction in the United States, 1962 and 1978.

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Table 4.—Wood products used in Military Construction by type of facility and use in the United States, 1962 and 1978

Type of facility and wood use	Lumber		Poles and piling		Plywood (3/8-inch)		Particle-board (3/4-inch)		Insulation board (1/2-inch)		Hardboard (1/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
	1,000 board ft.		1,000 linear ft.		.....		1,000 sq. ft.		.....		.....
Operational												
Structural	3,132.6	490.8	162.2	118.5	111.5	378.5	—	22.9	—	—	304.1	31.2
Millwork	81.1	185.1	—	—	30.4	432.6	—	14.6	—	—	—	4.2
Facilitating	9,458.5	2,364.6	—	—	6,275.3	1,316.4	—	—	—	—	—	—
Total	12,672.2	3,040.5	162.2	118.5	6,417.2	2,127.5	—	57.4	—	—	304.1	35.4
Maintenance												
Structural	689.5	246.7	8.4	87.4	168.7	99.4	—	—	—	—	21.1	—
Millwork	107.5	22.6	—	—	14.8	10.6	—	—	—	—	—	—
Facilitating	11,232.9	898.0	—	—	6,543.2	826.9	—	—	—	—	—	—
Total	12,030.0	1,167.3	8.4	87.4	6,726.7	936.8	—	—	—	—	21.1	—

Table 4.—Wood products used in Military Construction by type of facility and use in the United States, 1962 and 1978 — con.

Type of facility and wood use	Lumber		Poles and piling		Plywood (3/8-inch)		Particle-board (3/4-inch)		Insulation board (1/2-inch)		Hardboard (1/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
	1,000 board ft.		1,000 linear ft.		.....		1,000 sq. ft.		.....		.....
Training												
Structural	877.1	1,416.2	2.7	100.4	26.8	1,832.7	—	—	8.7	—	14.8	—
Millwork	311.4	186.6	—	—	89.3	65.4	—	1.4	—	—	22.1	2.2
Facilitating	3,072.2	941.0	182.5	—	2,703.1	752.5	—	—	—	—	—	—
Total	4,260.7	2,543.9	185.2	100.4	2,819.2	2,650.6	—	1.4	8.7	—	36.9	2.2
Research and development												
Structural	1,748.8	436.4	10.6	—	22.9	104.0	—	—	21.2	—	21.2	—
Millwork	206.5	87.9	—	—	68.8	33.7	—	—	—	—	—	—
Facilitating	7,388.7	1,467.3	—	—	4,837.0	1,110.0	—	—	—	—	271.8	—
Total	9,344.0	1,991.6	10.6	—	4,928.8	1,247.7	—	—	21.2	—	292.9	—
Warehouses and storage												
Structural	1,252.0	638.8	1.6	20.8	150.9	14.9	—	—	—	—	42.9	—
Millwork	178.0	8.9	—	—	82.6	27.5	—	0.7	—	—	—	1.5
Facilitating	3,120.5	795.8	—	—	1,906.6	632.2	—	—	—	—	—	—
Total	4,550.5	1,443.5	1.6	20.8	2,140.2	674.5	—	.7	—	—	42.9	1.5
Administration												
Structural	429.6	25.6	5.6	1.0	77.1	5.6	—	—	—	—	—	—
Millwork	244.6	22.8	—	—	82.2	7.4	—	.1	—	—	—	.2
Facilitating	1,464.3	139.2	—	—	780.8	111.4	—	—	—	—	—	—
Total	2,138.5	187.6	5.6	1.0	940.1	124.5	—	.1	—	—	—	.2
Enlisted quarters												
Structural	571.0	262.4	—	.5	638.0	98.5	—	—	—	6.5	—	155.1
Millwork	364.1	183.8	—	—	514.3	207.8	—	14.6	—	—	—	.4
Facilitating	6,864.9	508.8	—	—	4,076.0	410.9	—	—	—	—	—	—
Total	7,800.0	955.0	—	.5	5,228.3	717.2	—	14.6	—	6.5	—	155.5
Officers' quarters												
Structural	5,466.1	73.0	44.6	—	2,763.3	13.4	—	—	—	—	—	—
Millwork	946.9	125.7	—	—	290.9	151.3	—	3.2	—	—	—	14.1
Facilitating	856.0	185.8	—	—	538.8	145.2	—	—	—	6.5	—	—
Total	7,269.0	384.4	44.6	—	3,593.0	309.9	—	3.2	—	6.5	—	14.1
Community												
Structural	241.4	235.5	0.7	—	74.5	127.8	—	—	—	—	28.9	—
Millwork	58.7	196.4	—	—	95.8	90.0	—	2.4	—	—	—	0.1
Facilitating	907.9	448.1	—	—	377.2	308.4	—	—	—	—	—	—
Total	1,208.0	880.0	.7	—	547.4	526.2	—	2.4	—	—	28.9	.1
Sewage, waste treatment												
Structural	30.1	46.9	7.1	2.5	—	20.0	—	—	—	—	—	—
Millwork	5.9	1.4	—	—	—	2.3	—	2.5	—	—	—	—
Facilitating	1,635.7	427.8	—	—	917.2	352.8	—	—	—	—	—	—
Total	1,671.7	476.0	7.1	2.5	917.2	375.1	—	2.5	—	—	—	—
Water supply and distribution												
Structural	27.2	8.4	.8	—	—	8.4	—	—	—	—	—	—
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	383.3	48.5	—	—	212.4	38.0	—	—	—	—	—	—
Total	410.5	56.9	.8	—	212.4	46.4	—	—	—	—	—	—
Electrical distribution												
Structural	218.8	20.7	170.8	37.7	—	32.3	—	—	—	—	—	—
Millwork	.8	—	—	—	.8	—	—	—	—	—	—	—
Facilitating	1,209.5	192.5	—	—	446.8	153.7	—	—	—	—	—	—
Total	1,249.2	213.2	170.8	37.7	447.6	186.0	—	—	—	—	—	—
Docks and piers												
Structural	3,774.7	7,637.2	448.3	514.3	—	—	—	—	—	—	—	—
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	740.8	39.7	—	—	192.6	30.9	—	—	—	—	—	—
Total	4,515.5	7,676.9	448.3	514.3	192.6	30.9	—	—	—	—	—	—

U.S. Forest Products Laboratory.

Wood products used in military construction in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL. 1980
14 p. (USDA For. Serv. Resour. Bull. FPL 8).

Substantial quantities of lumber, poles and piling, plywood, particleboard, insulation board, and hardboard are used in construction of military facilities in the U.S.

The estimates in current and constant (1972) dollar values and quantities for wood and wood products used in military construction are presented for types of facilities and construction uses.

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U.S. Forest Products Laboratory.

Wood products used in military construction in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL. 1980
14 p. (USDA For. Serv. Resour. Bull. FPL 8).

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The estimates in current and constant (1972) dollar values and quantities for wood and wood products used in military construction are presented for types of facilities and construction uses.

Table 4.—Wood products used in Military Construction by type of facility and use in the United States, 1962 and 1978 — con.

Type of facility and wood use	Lumber		Poles and piling		Plywood (3/8-inch)		Particle-board (3/4-inch)		Insulation board (1/2-inch)		Hardboard (1/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
	1,000 board ft.		1,000 linear ft.		.....		1,000 sq. ft.		.....		.....
Total, all categories	18,458.9	11,538.8	863.3	883.2	4,033.8	2,735.5	—	22.9	29.9	6.5	432.9	186.3
Structural	2,505.4	1,021.1	—	—	1,269.9	1,028.6	—	39.5	—	—	22.1	22.7
Millwork	48,155.4	8,457.0	182.5	—	29,807.0	6,189.3	—	—	—	6.5	271.8	—
Facilitating	69,119.7	21,316.9	1,045.8	883.2	35,110.7	9,953.4	—	62.4	29.9	13.0	726.8	209.0

Note: Columns may not add to totals because of rounding.

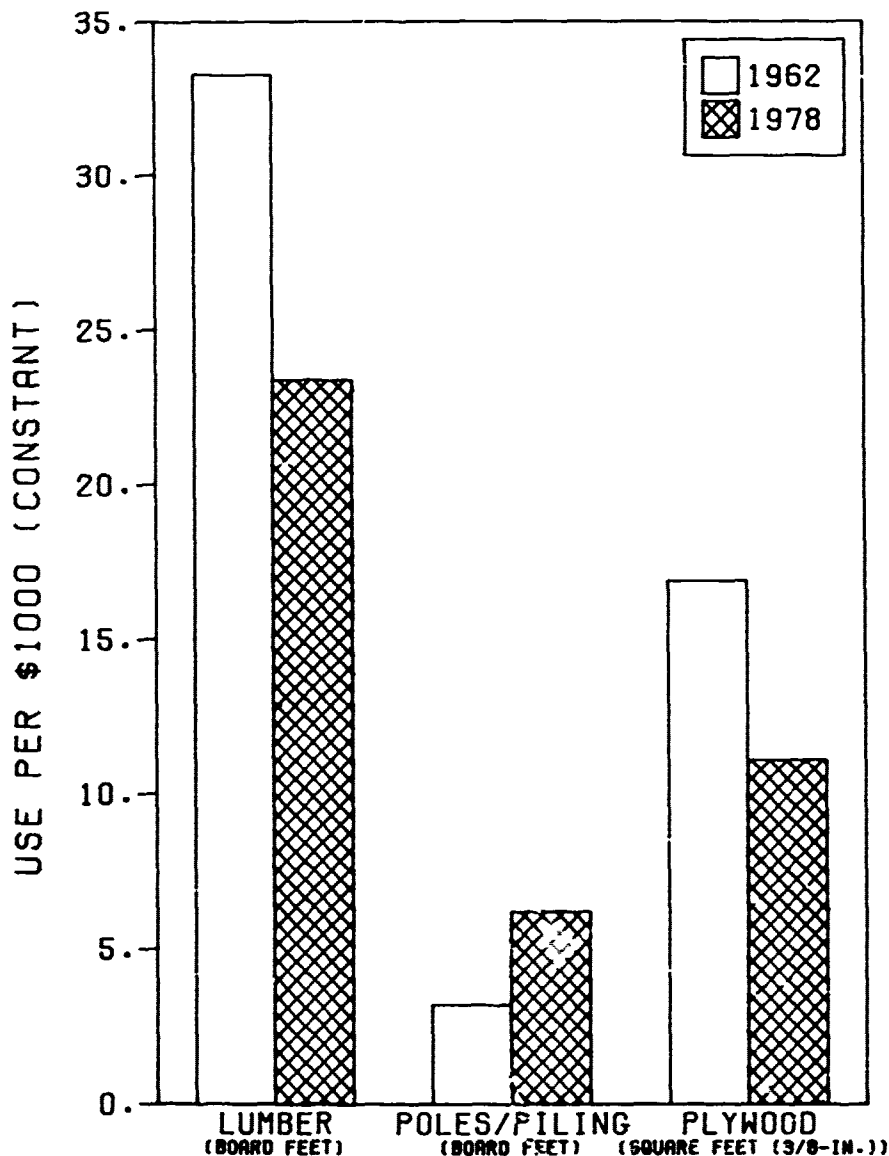


Figure 4.—Lumber, poles and piling, and plywood used per \$1,000 of construction value in military construction in the United States, 1962 and 1978.

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Table 5.—Lumber, poles and piling, and plywood used in Military Construction in the United States per \$1,000 of construction value and constant (1972) dollars by type of facility and use during 1962 and 1978

Type of facility and wood use	Lumber				Poles and piling				Plywood (3/8-inch)			
	Current		Constant		Current		Constant		Current		Constant	
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
	..... Board feet .....				..... Linear feet .....				..... Square feet			
Operational												
Structural	9.90	2.60	6.04	4.19	0.51	0.63	0.31	1.01	0.35	2.01	0.21	3.24
Millwork	.26	.98	.16	1.58	—	—	—	—	.10	2.29	.06	3.70
Facilitating	29.68	12.54	18.23	20.21	—	—	—	—	19.63	6.96	12.10	11.25
Total	40.04	16.13	24.43	25.99	.51	.63	.31	1.01	20.28	11.29	12.37	18.18
Maintenance												
Structural	3.40	.95	2.08	1.52	.04	.33	.03	.54	.83	.38	.51	.61
Millwork	.53	.09	.32	.14	—	—	—	—	.07	.04	.04	.07
Facilitating	55.45	3.44	33.83	5.54	—	—	—	—	32.30	3.17	19.71	5.10
Total	59.39	4.47	36.23	7.21	.04	.33	.03	.54	33.21	3.59	20.26	5.78
Training												
Structural	9.90	9.77	6.04	15.74	.03	.69	.02	1.12	.30	12.64	.18	20.36
Millwork	3.51	1.29	2.14	2.07	—	—	—	—	1.01	.45	.61	.73
Facilitating	34.67	6.49	21.15	10.46	2.06	—	1.26	—	30.50	5.19	18.61	8.36
Total	48.08	17.54	29.33	28.27	2.09	.69	1.28	1.12	31.81	18.28	19.41	29.45
Research and development												
Structural	7.67	1.50	4.68	2.42	.05	—	.03	—	.10	.36	.06	.58
Millwork	.91	.30	.55	.49	—	—	—	—	.30	.12	.18	.19
Facilitating	32.42	5.06	19.78	8.15	—	—	—	—	21.23	3.83	12.95	6.17
Total	41.00	6.87	25.02	11.06	.05	—	.03	—	21.63	4.30	13.20	6.93
Warehouses and storage												
Structural	24.72	4.90	15.08	7.89	0.03	0.16	0.02	0.26	2.98	0.11	1.82	0.18
Millwork	3.51	.07	2.14	.11	—	—	—	—	1.63	.21	1.00	.34
Facilitating	61.62	6.10	37.60	9.82	—	—	—	—	37.65	4.84	22.97	7.80
Total	89.86	11.06	54.83	17.82	.03	.16	.02	.26	42.26	5.17	25.79	8.33
Administration												
Structural	8.48	.88	5.18	1.42	.11	.03	.07	.06	1.52	.19	.93	.31
Millwork	4.83	.79	2.95	1.27	—	—	—	—	1.62	.26	.99	.41
Facilitating	28.92	4.80	17.64	7.73	—	—	—	—	15.42	3.84	9.41	6.19
Total	42.23	6.47	25.76	10.42	.11	.03	.07	.06	18.56	4.29	11.33	6.92
Enlisted quarters												
Structural	4.51	3.02	2.75	4.86	—	.01	—	.01	5.04	1.13	3.07	1.82
Millwork	2.88	2.11	1.75	3.40	—	—	—	—	4.06	2.39	2.48	3.85
Facilitating	54.23	5.85	33.08	9.42	—	—	—	—	32.20	4.72	19.64	7.61
Total	61.61	10.98	37.59	17.68	—	.01	—	.01	41.30	8.24	25.20	13.28
Officers' quarters												
Structural	215.88	5.03	131.71	8.11	1.76	—	1.08	—	109.14	.92	66.59	1.49
Millwork	37.40	8.67	22.82	13.96	—	—	—	—	11.49	10.44	7.01	16.81
Facilitating	33.81	12.81	20.63	20.64	—	—	—	—	21.28	10.02	12.98	16.14
Total	287.08	26.51	175.16	42.71	1.76	—	1.08	—	141.91	21.37	86.58	34.44
Community												
Structural	9.53	3.25	5.82	5.23	0.03	—	0.02	—	2.94	1.76	1.79	2.84
Millwork	2.32	2.71	1.41	4.36	—	—	—	—	3.78	1.24	2.31	2.00
Facilitating	35.86	6.18	21.88	9.96	—	—	—	—	14.90	4.25	9.09	6.85
Total	47.71	12.14	29.11	19.56	.03	—	.02	—	21.62	7.26	13.19	11.69
Sewage, treatment and disposal												
Structural	1.19	.54	.72	.87	.28	0.03	.17	.05	—	.23	—	.37
Millwork	.23	.04	.14	.03	—	—	—	—	—	.03	—	.04
Facilitating	64.60	4.92	39.41	7.92	—	—	—	—	36.22	4.06	22.10	6.53
Total	66.02	5.47	40.28	8.82	.28	.03	.17	.05	36.22	4.31	22.10	6.95

Table 5.—Lumber, poles and piling, and plywood used in Military Construction in the United States per \$1,000 of construction value and constant (1972) dollars by type of facility and use during 1962 and 1978 — con.

Type of facility and wood use	Lumber				Poles and piling				Plywood (3/8-inch)			
	Current		Constant		Current		Constant		Current		Constant	
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
	----- Board feet -----				----- Linear feet -----				----- Square feet -----			
Water supply and distribution												
Structural	2.15	.29	1.31	.47	.06	—	.04	—	—	.29	—	.47
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	30.27	1.67	18.47	2.69	—	—	—	—	16.78	1.31	10.24	2.11
Total	32.42	1.96	19.78	3.16	.06	—	.04	—	16.78	1.60	10.24	2.58
Electrical source and distribution												
Structural	2.47	0.29	1.51	0.46	1.93	0.52	1.18	0.84	—	0.45	—	0.72
Millwork	.01	—	.01	—	—	—	—	—	0.01	—	0.01	—
Facilitating	11.62	2.65	7.09	4.28	—	—	—	—	5.04	2.12	3.08	3.42
Total	14.10	2.94	8.60	4.74	1.93	.52	1.18	.84	5.05	2.57	3.08	4.13
Docks and piers												
Structural	149.08	175.57	93.96	282.86	17.71	11.82	10.80	19.05	—	—	—	—
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	29.26	.91	17.85	1.47	—	—	—	—	7.61	.71	4.64	1.14
Total	178.34	176.48	108.81	284.33	17.71	11.82	10.80	19.05	7.61	.71	4.64	1.14
Weighted average, all categories												
Structural	14.58	7.96	8.90	12.82	.68	.61	.42	.98	3.19	1.89	1.94	3.04
Millwork	1.98	.70	1.21	1.13	—	—	—	—	1.00	.71	.61	1.14
Facilitating	38.04	5.83	23.21	9.40	.14	—	.09	—	23.54	4.27	14.36	6.83
Total	54.60	14.49	33.31	23.35	.83	.61	.51	.98	27.73	6.86	16.92	11.06

Note: Columns may not add to totals because of rounding.

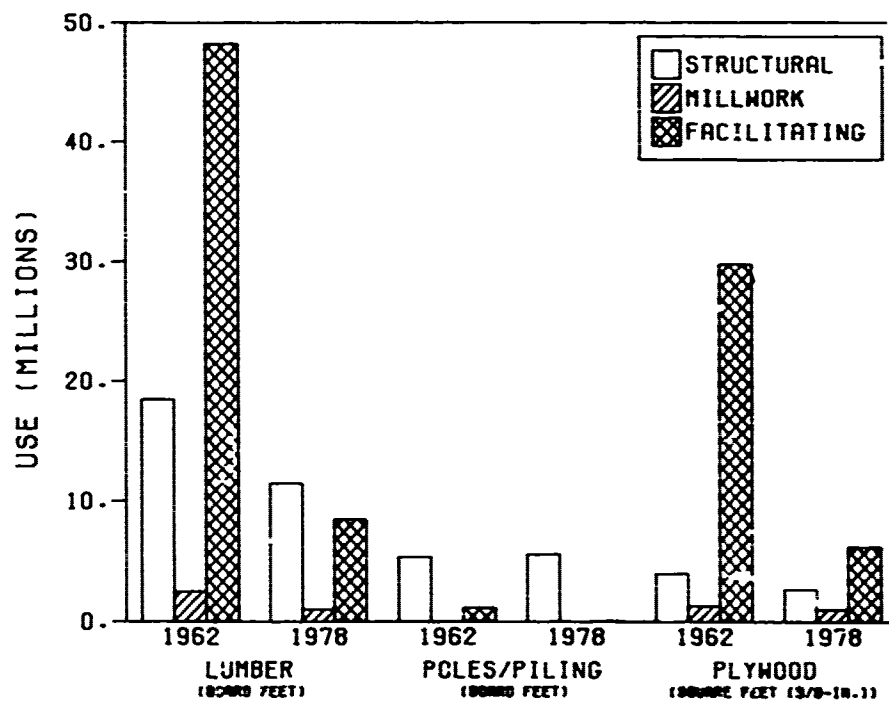


Figure 5.—Lumber, poles and piling, and plywood used in military construction by type of use in the United States, 1962 and 1978.

M 148 837

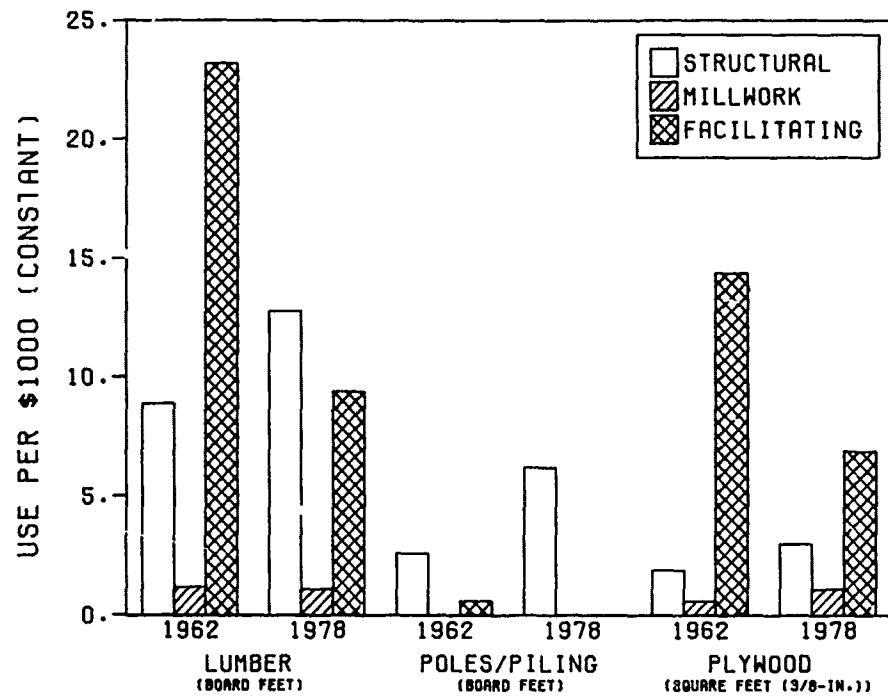


Figure 6.—Lumber, poles and piling, and plywood used per \$1,000 of construction value in military construction by type of use in the United States, 1962 and 1978. M 148 838

Table 6.—Particleboard, insulation board, and hardboard used in Military Construction in the United States per \$1,000 of construction and constant (1972) dollars by type of facility and use during 1962 and 1978

Type of facility and wood use	Particleboard (3/4-inch basis)		Insulation board (1/2-inch basis)		Hardboard (1/8-inch basis)		Square feet						
	Current		Constant		Current		Constant		Current		Constant		
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	
Operational													
Structural	—	0.12	—	0.20	—	—	—	—	0.96	0.17	0.59	0.17	
Millwork	—	.08	—	.12	—	—	—	—	—	.02	—	.04	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	.20	—	.32	—	—	—	—	.96	.19	.59	.30	
Maintenance													
Structural	—	—	—	—	—	—	—	—	.10	—	.06	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	—	—	—	—	—	—	—	.10	—	.06	—	
Training													
Structural	—	—	—	—	0.10	—	0.06	—	.17	—	.10	—	
Millwork	—	.01	—	.02	—	—	—	—	.25	.02	.15	.02	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	.01	—	.02	.10	—	.06	—	.42	.02	.25	.02	
Research and development													
Structural	—	—	—	—	.09	—	.06	—	.09	—	.06	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	1.19	—	.73	—	
Total	—	—	—	—	.09	—	.06	—	1.29	—	.78	—	
Warehouses and storage													
Structural	—	—	—	—	—	—	—	—	0.85	—	0.52	—	
Millwork	—	0.01	—	0.01	—	—	—	—	—	0.01	—	0.02	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	.01	—	.01	—	—	—	—	.85	.01	.52	.02	
Administration													
Structural	—	—	—	—	—	—	—	—	—	—	—	—	
Millwork	—	—	—	—	—	—	—	—	—	.01	—	.01	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	—	—	—	—	—	—	—	—	.01	—	.01	
Enlisted quarters													
Structural	—	—	—	—	—	0.07	—	0.12	—	1.78	—	2.87	
Millwork	—	.17	—	.27	—	—	—	—	—	—	—	.01	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—	
Total	—	.17	—	.27	—	.07	—	.12	—	1.78	—	2.88	
Officers' quarters													
Structural	—	—	—	—	—	—	—	—	—	—	—	—	
Millwork	—	.22	—	.36	—	—	—	—	—	.97	—	1.57	
Facilitating	—	—	—	—	—	.45	—	.72	—	—	—	—	
Total	—	.22	—	.36	—	.45	—	.72	—	.97	—	1.57	
Community													
Structural	—	—	—	—	—	—	—	—	1.14	—	0.70	—	
Millwork	—	0.03	—	0.05	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	1.14	—	—	—	
Total	—	.03	—	.05	—	—	—	—	1.14	—	.70	—	

Table 6.—Particleboard, insulation board, and hardboard used in Military Construction in the United States per \$1,000 of construction value and constant (1972) dollars by type of facility and use during 1962 and 1978 — con.

Type of facility and wood use	Particleboard (3/4-inch basis)		Insulation board (1/2-inch basis)		Hardboard (1/8-inch basis)							
	Current		Constant		Current		Constant					
	1962	1978	1962	1978	1962	1978	1962	1978				
..... Square feet												
Sewage, treatment and disposal	—	—	—	—	—	—	—	—	—	—	—	
Structural	—	.03	—	.05	—	—	—	—	—	—	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	
Total	—	.03	—	.05	—	—	—	—	—	—	—	
Water supply and distribution	—	—	—	—	—	—	—	—	—	—	—	
Structural	—	—	—	—	—	—	—	—	—	—	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	
Total	—	—	—	—	—	—	—	—	—	—	—	
Electrical source and distribution	—	—	—	—	—	—	—	—	—	—	—	
Structural	—	—	—	—	—	—	—	—	—	—	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	
Total	—	—	—	—	—	—	—	—	—	—	—	
Docks and piers	—	—	—	—	—	—	—	—	—	—	—	
Structural	—	—	—	—	—	—	—	—	—	—	—	
Millwork	—	—	—	—	—	—	—	—	—	—	—	
Facilitating	—	—	—	—	—	—	—	—	—	—	—	
Total	—	—	—	—	—	—	—	—	—	—	—	
Weighted average, all categories	—	0.02	—	0.03	0.02	—	0.01	0.01	0.34	0.13	0.21	0.21
Structural	—	.03	—	.04	—	—	—	—	.02	.02	.01	.03
Millwork	—	—	—	—	—	—	—	.01	.21	—	.13	—
Facilitating	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	.04	—	.07	.02	.01	.01	.01	.57	.14	.35	.23

Note: Columns may not add to totals because of rounding.

Appendix

Facilities Classification

1. Operational
Taxiways and aprons, communications facility, radar flight control centers, navigation facility, headquarters command and control facility, satellite tracking support facility, aircraft control towers
2. Maintenance
Maintenance and repair facilities (tank, automotive aircraft, and equipment)
3. Training
Academic facility, technical training facility, personnel rehabilitation center
4. Research and development
Materials laboratory, armament, ballistics research laboratories, human resources research facility, radar tracking facility
5. Warehouse
Logistical materials facility, fuel supply facility
6. Administration
Base management facility, base personnel office, headquarters facility
7. Enlisted housing
Bachelor quarters
8. Officers' housing
Bachelor quarters
9. Community facility
Chapel centers, commissaries, open mess, post office, libraries and gymnasiums
10. Sewage
Sewage and industrial waste treatment and disposal
11. Water
Water supply treatment and distribution
12. Electrical
Electrical distribution and miscellaneous utilities
13. Dock
Docks, piers and wharves