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**CAPACITY EXPANSION**  
**PLANNING FACTORS**

Progress Report  
to  
The Agency for International Development  
U.S. Department of State

by  
The National Planning Association

under  
Contract AID/csd - 753

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EX-101  
Official File 0202

## I. Summary

Agencies concerned with development planning have long felt the need for a comprehensive and consistent source of data on the costs, in total and by industrial origin, of expanding industrial capacity in particular industries. Two major sources have been available: (a) the report on "Capital Requirements for the Expansion of Industrial Capacity," compiled by Robert N. Grosse of the Bureau of the Budget in 1953 from data prepared by the several government agencies and universities participating in the Interindustry Economic Research Program sponsored by the Air Force; and (b) the Industry Profile Studies and Industry Fact Sheets prepared for the Agency for International Development. Both these sources have been extremely useful.

However, the data contained in the Grosse volumes, which were based largely on World War II experience, are getting badly out of date. The 192-sector Emergency Model classification which it reflects is also too aggregative for many purposes. Finally, it suffers from considerable unevenness in data sources, with resulting inconsistencies, errors, and omissions in the compilation.

The Industry Profile Studies and Industry Fact Sheets are more recent, and more detailed, but are designed to be more suitable for individual projects or pre-investment analysis than for planning overall development strategy. They do not provide data in any consistent classification framework suitable for model building, nor do they come close to providing complete coverage of the industries which may be of interest.

The present study is designed to meet a part of the need for a comprehensive, current, and detailed compendium of planning factors for capacity expansion, in a consistent framework. Capital coefficients have been developed for all U.S. manufacturing industries, classified into 252 industry groups, based on the U.S. Standard Industrial Classification, in large part at the 4-digit level. Data sources mostly reflect U.S. experience in the period from 1946-1957. The data comprise 2 major sets:

- (a) total capital:output ratios for each industry, and
- (b) inputs of construction, equipment, and labor per dollar of investment in each industry, with common inputs grouped into functional "modules."

These data, and the associated discussion of concepts and methodology, will be incorporated in a manual of about 400 pages, to be furnished to AID about the end of this year.

Much of the empirical work underlying this study was performed under separate contracts with the Office of Emergency Planning in connection with the PARM (Program Analysis for Resource Management) Project. The National Resource Evaluation Center of OEP has also provided automatic data-processing support for preparation of the special factor files prepared for AID.

The empirical work leading to initial development of the factors for AID has been substantially completed. Much of the remaining time and funds available under the contract will be used in testing and evaluation of the factors by using them to reconstruct actual U.S. inputs to plant expansion in a recent year or years; in making necessary revisions; in preparation of explanatory text; and in the preparation of the final report.

## II. Capital:Output Ratios

The beginning of the chain of relationships which combine to portray the capital requirements of an industry is the so-called "capital:output ratio." As used in this study, and generally by others, it might better be labelled a "capital:capacity ratio," for it tells the amount of plant and equipment needed to have the capability of producing a unit of industry output at capacity production levels. However, because the term is almost universally labelled the "capital:output ratio," that title will be used in this discussion.

Given the capital:output ratio, the analyst knows how much plant and equipment (combined) are needed to produce a given requirement for output. If he further decides that the facility will operate at some average level just below full capacity, he can readily determine the capital requirements needed to maintain a given level of output.

The National Planning Association has determined capital:output ratios, in preliminary form, for the 252 industries which comprise the manufacturing portion of its so-called Recovery Model Classification (RMC) <sup>1/</sup>. These ratios are broken down into plant vs. equipment in the first stage of analysis. It is probable, however, that only the total will be shown in the final presentation because of certain problems in reconciling the meaning of plant as against equipment for some industries. Furthermore, the overall NPA procedure for using capital coefficients does not require such separation.

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<sup>1/</sup> The RMC listing is similar to the previous Prototype Model Classification but somewhat more disaggregated in the manufacturing area.

The capital data were derived basically from the Census Bureau's Manufacturing Censuses for 1947 and 1954 and Annual Surveys of Manufactures for 1949-1953 and 1955-1957, showing annual expenditures for plant and for equipment for each industry. The information was related to data for 1957 on book value and depreciation of depreciable assets of manufacturing industries collected by the Census Bureau in a special report MC-58 (1)-9, associated with the 1958 Census of Manufactures. Use was made of various guidelines as to depreciation rates in each industry, such as Bulletin F of the Internal Revenue Service and recent revised guidelines of allowable depreciation rates. Adjustments were made for changes in the prices of plant and equipment items and an allowance was included for the imputed value of leased equipment. All data were converted to constant 1958 dollars, representing the value of fixed capital in use in mid-1957, stated in the price levels that would have applied if the plant and equipment were purchased in 1958.

The production data were derived from material in the 1958 Census of Manufactures, reclassified into RMC detail by proper aggregation. Capacity data were estimated by varied techniques, depending mostly on Federal Reserve Board data. The "normal capacity" levels calculated are the estimates of output that might have been achieved in 1958 if all industries had been producing at "peak" levels. These "peak" levels are read from the envelope of straight lines connecting peak monthly production levels in years surrounding and including 1958. Some judgment was necessary to spot turning points and to choose among conflicting slopes or levels.

Industries with strongly seasonal production patterns resulting from seasonal availability of major inputs (e.g., fruit and vegetable packing) were adjusted before determining peak levels.

Once the yearly capacity levels have been determined for an industry, the capital:output ratio is determined by dividing the dollar capital requirement by the value of yearly output at capacity production. The next step in the analysis is to break down the capital requirement into its various plant, equipment, and labor modules.

### III. Capital Input Factors

Inputs to new fixed capital formation have been incorporated in a separate industry expansion table for each of the 252 manufacturing industries. These factors add to unity for each industry. Inputs of specialized and common process equipment (the "process modules") are defined in terms of the specific product, product class, or industry of origin for each input. All other inputs are grouped into a series of functional modules, each of which is generally used in common by a number of industries.

These modules are of several types. Auxiliary facility modules represent separate facilities which perform some essential function for the core process activity, such as water supply, electric power generation, steam generation, etc. For some of these functions, there is an option to purchase the service from a public utility. Where this situation exists, the factor used reflects the proportion of purchased services which is prevalent in the U.S. for the particular industry. The user of the data may modify this proportion if he wishes.

Each industry process module and auxiliary facility module requires inputs of equipment, equipment installation labor and materials, and construction. These in turn are grouped into additional functional modules.

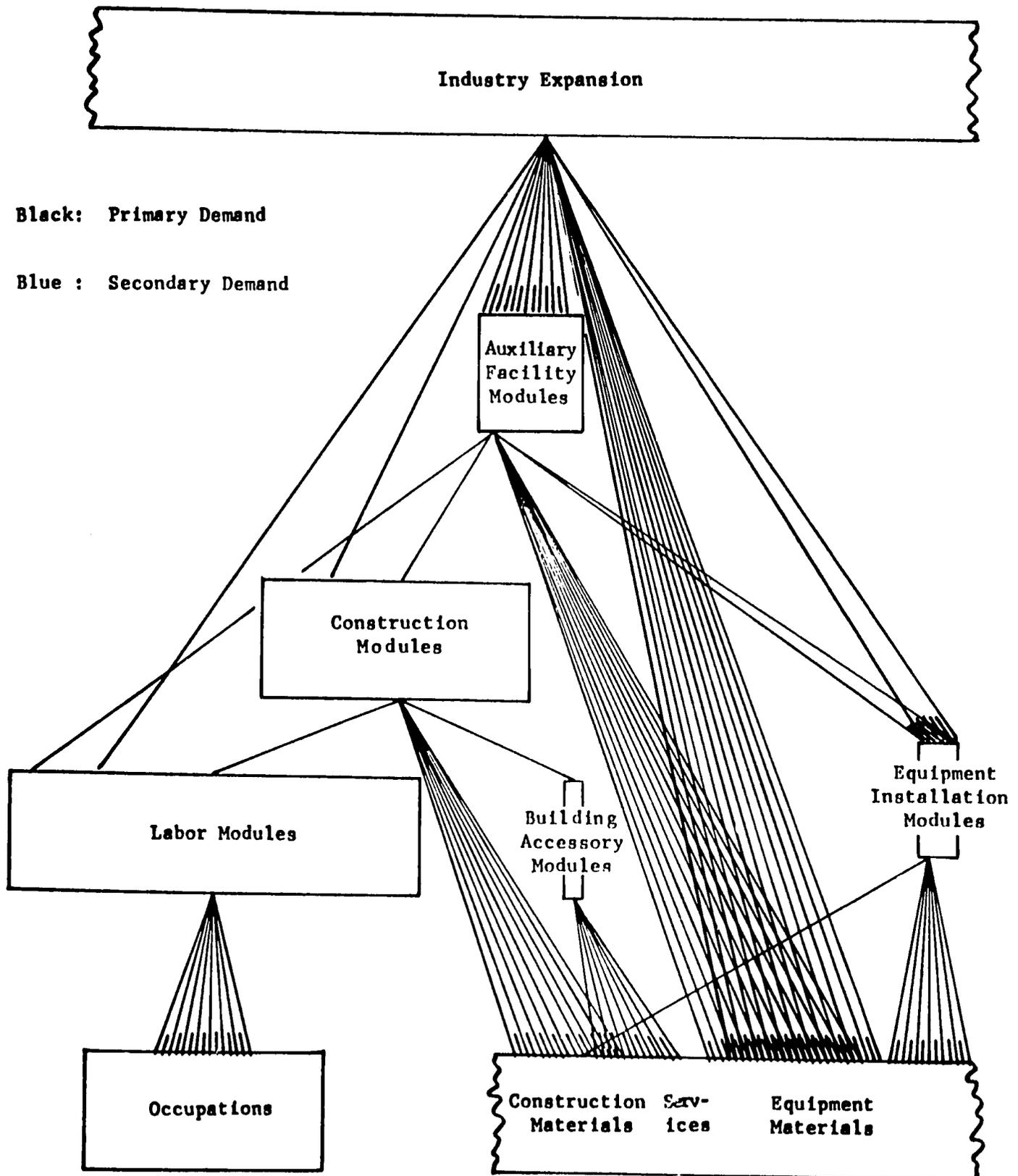
Equipment installation modules are six different "packages" of materials, each associated with a different equipment installation function. Within each module, the proportions of the various materials are fixed, but the proportions in which the six different modules are used will vary from industry to industry. Inputs of materials to each module are defined at the product or product class level. There are also a

number of equipment installation manpower modules, each translating total equipment installation labor cost into man-hour demands by occupation. The different modules are stratified by "expansion factors." (These measure the ratio of total installed equipment cost to process equipment cost alone.) Because of the change of units, from dollars to man-hours, these factors do not add to unity.

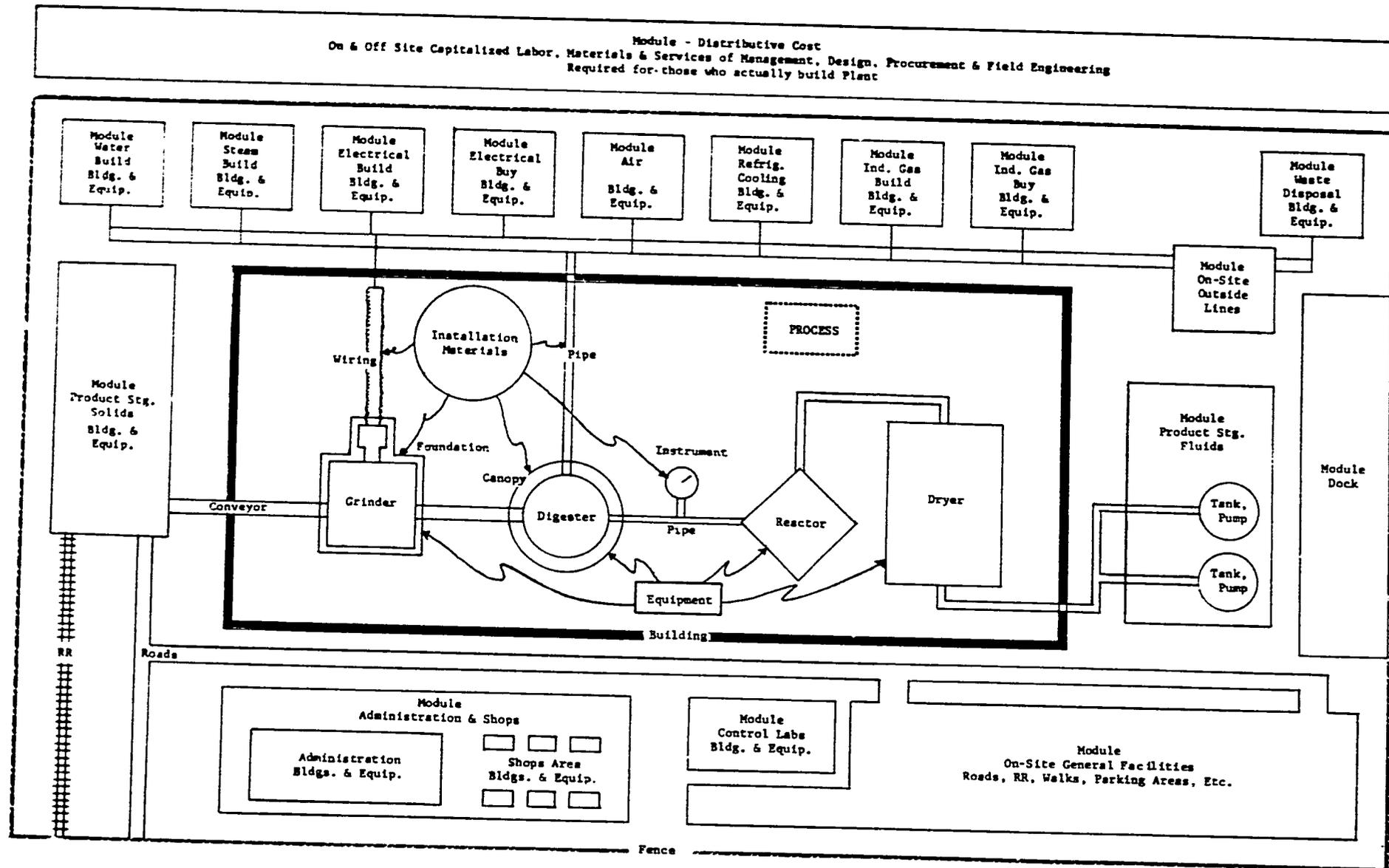
Construction modules have been defined for 35 different types of structures covering the whole range of industrial construction. Each of these is used as an input to many of the 252 manufacturing industry expansion tables. Each also places demands on one of three building accessory modules, and one of 35 associated construction labor modules. Each construction module also has inputs of a number of construction materials, defined at the product or product class level of detail.

The flow of demands among these modules is illustrated by the flow chart on the next page. A schematic plant layout showing the functional relationships of these modules for a hypothetical plant is given on the subsequent page.

MODULAR CAPACITY EXPANSION  
DEMAND FLOW



**SCHEMATIC PLANT LAYOUT**  
**MODULAR CONSTRUCTION**



#### IV. Final Report Outline

The presently planned outline of the final report is as follows:

	<u>No. of pages</u>
Introduction	5
Empirical Development	50
Validation Tests	15
Factors and Leadtimes	310
Industry Expansion Tables	252
Common Modules	58
Supporting Tables	<u>20</u>
Total	<u>400</u>

Attached are lists of the industries for which capacity expansion planning factors have been developed, and of the input item classification used in the factor files. Sample pages illustrating the final report format for each of the principal types of modules follow thereafter.

The first attachment, "Manufacturing Industries for which Capital Coefficients Have Been Developed," consists of 7 pages.

The second attachment, "Equipment, Material and Labor Items in Capital Coefficients," comprises 12 pages.

The sample pages include one page each for a set of capital coefficients for an industry, equipment installation modules, construction modules, building accessory modules, auxiliary facility modules (water), and labor modules.

## V. Work Schedule

The following major steps are contemplated to complete the project:

- a. July 1965            Review all factors for consistency and reasonableness and adjust to constant 1958 price levels
- b. Aug.-Sept.  
1965                 Apply entire factor file to 1958-59 investment data and test against 1958 benchmark data from Office of Business Economics. Prepare draft text of final report.
- c. October 1965        Make corrections and revisions to reflect results of test, and prepare text of report in final form.
- d. November 1965      Reproduce all tables for final report, and 30 copies of text, for review by AID.
- e. December 1965      Review and revise text as necessary.
- f. January 1966        Reproduce 200 copies of final report.

Approximately half of the funds available under the contract have been expended. It appears feasible to complete the work with the remaining available funds. However, it has been necessary to use somewhat more clerical and junior professional effort than was anticipated, with the result that nearly two-thirds of the authorized man-months have been utilized. A request will be made that the authorized man-months be raised from 24.5 to 28.0, in conformity with the attached table.

### Budget Projection

	Man-Months				Cost	
	Actual To 6/30	Required To Complete	Total Required	Contract Author- ization	Total Required	Contract Author- ization
Center Director <sup>1/</sup>	0.2	-	0.2	1.0	\$ 380	\$ 1,792
Asst. Director	-	0.3	0.3	-	420	-
Principal Economist	0.9	0.7	1.6	2.0	2,560	3,000
Industrial Economist	5.3	5.3	10.6	10.0	13,250	12,000
Consulting Engineer	0.3	-	0.3	1.0	325	1,150
Economist	-	-	-	2.0	-	1,700
Computer Programmer	-	-	-	-1.0	-	800
Mathematician	0.2	0.2	0.4	-	420	-
Research Assistants	7.6	4.0	11.6	2.5	4,615	1,250
Presentation Draftsman	-	-	-	1.0	-	500
Administrative Asst.	0.6	1.0	1.6	-	840	-
Typist	<u>0.8</u>	<u>0.6</u>	<u>1.4</u>	<u>4.0</u>	<u>630</u>	<u>1,800</u>
Total Salaries	15.9	12.2	28.0	24.5	\$23,440	\$23,992
Other Direct Expenses <sup>2/</sup>					<u>8,553</u>	<u>8,001</u>
Total Direct Expenses					\$31,993	\$31,993
Overhead					<u>6,398</u>	<u>6,398</u>
Total Expenses					\$38,391	\$38,391

<sup>1/</sup> Center Director's time charged to overhead since June 1, 1965.

<sup>2/</sup> Includes \$1,600 printing cost for final report.

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed

020110	MEAT PRODUCTS
020150	POULTRY DRESSING & EGG PROCESSING
020210	CREAMERY BUTTER
020220	NATURAL CHEESE
020230	CONDENSED & EVAPORATED MILK
020240	ICE CREAM & FROZEN DESSERTS
020260	FLUID MILK & COTTAGE CHEESE
020310	CANNED & CURED SEAFOODS
020320	CANNED SPECIALTIES
020330	CANNED FRUITS & VEGETABLES
020340	DEHYDRATED FRUITS & VEGETABLES
020350	PICKLES & SAUCES
020360	FRESH OR FROZEN PKGD FISH
020370	FROZEN FRUITS & VEGETABLES
020410	FLOUR & MEAL
020420	PREPARED ANIMAL FEEDS
020430	CEREAL PREPARATIONS
020440	RICE MILLING
020460	WHT CORN MILLING
020510	BREAD & OTHER BAKERY PRODUCTS
020520	BISCUITS & CRACKERS
020610	RAW CANE SUGAR DOMESTIC
020620	CANE SUGAR REFINING
020630	BEEF SUGAR
020700	CANDY & RELATED PRODUCTS
020820	MALT LIQUORS
020830	MALT
020840	WINES & BRANDY
020850	DISTILLED & BLENDED LIQUORS
020860	BOTTLED & CANNED SOFT DRINKS
020870	FLAVORING EXTRACTS & SIRUPS
020910	COTTONSEED OIL
020920	SOYBEAN OIL
020930	OTHER VEGETABLE OILS
020940	GREASE & TALLOW
020950	ANIMAL OILS EXCEPT LARD
020960	SHORTENING, COOKING OILS, MARGARINE
020970	MANUFACTURED ICE
020980	MACARONI & SPAGHETTI
020990	FOOD PREPARATIONS, NEC

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Continued)

021110	CIGARETTES
021210	CIGARS
021310	CHEWING & SMOKING TOBACCO
021410	TOBACCO STEMMING & REDRYING
022000	SPINNING, WEAVING & DYEING
022500	KNITTING MILLS
022700	FLOOR COVERINGS
022900	MISC. TEXTILE GOODS
022990	JUTE, LINEN, CORDAGE & TWINE
023110	MENS & BOYS SUITS & COATS
023200	MENS & BOYS OTHER GARMENTS
023300	WOMENS & MISSES OUTERWEAR
023400	WOMENS & INFANTS UNDERGARMENTS
023600	CHILDRENS & INFANTS OUTERWEAR
023710	FURS & FUR GOODS
023800	MISC. APPAREL & ACCESSORIES
023900	MISC. FABRICATED TEXTILE PRODS.
023930	TEXTILE BAGS
023940	CANVAS PRODUCTS
024110	LOGGING
024200	SAWMILLS & PLANING MILLS
024310	MILLWORK & OTHER WOOD PRODUCTS
024320	VENEER & PLYWOOD
024400	WOODEN CONTAINERS
024910	WOOD PRESERVING
025110	WOOD HOUSEHOLD FURNITURE
025140	METAL HOUSEHOLD FURNITURE
025150	MATTRESSES & BEDSPRINGS
025210	WOOD OFFICE FURNITURE
025310	METAL OFFICE & PUBLIC BLDG. FURN.
025400	PARTITIONS, SHELVING & LOCKERS
025910	VENETIAN BLINDS & SHADES
026110	PULP MILLS
026210	PAPER MILLS
026310	PAPERBOARD MILLS
026400	CONVERTED PAPER PRODUCTS
026430	PAPER BAGS
026500	PAPERBOARD CONTAINERS & BOXES
026610	BUILDING PAPER & BOARD MILLS
027000	PRINTING & PUBLISHING

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Continued)

028120	ALKALIES & CHLORINE
028130	INDUSTRIAL GASES
028160	INORGANIC PIGMENTS
028180	INDUSTRIAL ORGANIC CHEMICALS
028190	INDUSTRIAL INORGANIC CHEMICALS
0281A0	ALUMINA
0281S0	SULFURIC ACID
028210	PLASTICS MATERIALS
028220	SYNTHETIC RUBBER
028230	CELLULOSIC & SYNTHETIC FIBERS
028300	DRUGS
028410	SOAP & OTHER DETERGENTS
028420	SPECIALTY CLEANING & OTHER PREPS.
028430	SURFACE ACTIVE & FINISHING AGENTS
028440	PERFUMES & TOILET PREPARATIONS
028500	PAINTS & ALLIED PRODUCTS
028610	GUM & WOOD CHEMICALS
028710	FERTILIZERS
028790	AGRIC. PESTICIDES & CHEMICALS
028910	GLUE & GELATIN
028920	EXPLOSIVES
028930	PRINTING INK & CARBON BLACK
028990	MISC. CHEMICAL PREPARATIONS
029100	PETROLEUM REFINERY OPERATION
029510	PAVING MIXTURES & BLOCKS
029520	ASPHALT FELTS & COATINGS
030110	TIRES & INNER TUBES
030210	RUBBER FOOTWEAR
030690	FABRICATED RUBBER PRODUCTS
030790	MISC. PLASTICS PRODUCTS
031110	LEATHER TANNING AND FINISHING
031210	INDUSTRIAL LEATHER PRODUCTS
031310	BOOT & SHOE CUT STOCK
031410	FOOTWEAR, EXCEPT RUBBER
031610	LUGGAGE
031700	HANDBAGS, PURSES, ETC.
031990	MISC. LEATHER GOODS
032200	GLASS & GLASSWARE
032310	FLAT GLASS & GLASS PRODUCTS
032410	CEMENT

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Continued)

032500	STRUCTURAL CLAY PRODUCTS
032600	POTTERY AND RELATED PRODUCTS
032720	CONCRETE PRODUCTS
032730	READY MIXED CONCRETE
032740	LIME
032750	GYPSUM PRODUCTS
032810	CUT STONE & STONE PRODUCTS
032910	ABRASIVE PRODUCTS
032920	ASBESTOS PRODUCTS
032950	MISC. NONMETALLIC MINERALS
032960	MINERAL WOOL
032970	NONCLAY REFRACTORIES
033100	BLAST FURNACES & STEEL MILLS
033210	GRAY IRON FOUNDRIES
033230	STEEL FOUNDRIES
033310	PRIMARY COPPER SMELTING & REFINING
033320	PRIMARY LEAD SMELTING & REFINING
033330	PRIMARY ZINC SMELTING & REFINING
033340	PRIMARY ALUMINUM REDUCTION
033390	NONFERROUS METALS REFINING, NEC
033410	SECONDARY NONFERROUS METAL SERVICES
033510	COPPER ROLLING & DRAWING
033520	ALUMINUM ROLLING & DRAWING
033560	NONFERROUS METAL ROLLING, NEC
033570	NONFERROUS WIRE DRAWING
033610	ALUMINUM CASTINGS
033620	COPPER CASTINGS
033690	NONFERROUS CASTINGS, NEC
033910	IRON & STEEL FORGINGS
033920	NONFERROUS FORGINGS
033990	PRIMARY METAL INDUSTRIES, NEC
034110	METAL CANS
034210	CUTLERY
034230	HAND & EDGE TOOLS, HAND SAWS
034290	HARDWARE, NEC
034320	METAL PLUMBING FIXTURES
034330	HEATING EQUIPMENT, NONELECTRIC
034410	FABRICATED STRUCTURAL STEEL
034430	BOILER SHOP PRODUCTS
034490	MISC. STRUCTURAL METAL PRODUCTS

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Continued)

034510	SCREW MACHINE PRODUCTS
034520	BOLTS, NUTS, SCREWS & RIVETS
034610	METAL STAMPINGS
034700	METAL PLATING & COATING
034810	MISC. FABRICATED WIRE PRODUCTS
034910	METAL DRUMS, BARRELS, KEGS, ETC.
034930	STEEL SPRINGS
034940	VALVES & PIPE FITTINGS
034980	FABRICATED PIPE
034990	MISC. FABRICATED METAL PRODUCTS
035110	STEAM ENGINES & TURBINES
035190	INTERNAL COMBUSTION ENGINES
035220	FARM MACHINERY & EQUIPMENT
035310	CONSTRUCTION MACHINERY & EQUIPMENT
035320	MINING MACHINERY & EQUIPMENT
035330	OIL FIELD MACHINERY & EQUIPMENT
035340	ELEVATORS & MOVING STAIRWAYS
035350	CONVEYORS & HOISTS
035370	INDUSTRIAL TRUCKS & TRACTORS
035410	MACHINE TOOLS & ACCESSORIES
035440	SPECIAL DIES & TOOLS
035480	OTHER METAL WORKING MACHINERY
035510	FOOD PRODUCTS MACHINERY
035520	TEXTILE MACHINERY
035540	PAPER INDUSTRIES MACHINERY
035550	PRINTING TRADES MACHINERY & EQUIP.
035590	SPECIAL INDUSTRIAL MACHINERY, NEC
035610	PUMPS & COMPRESSORS
035620	BALL & ROLLER BEARINGS
035640	BLOWERS & FANS
035660	POWER TRANSMISSION EQUIPMENT
035670	INDUSTRIAL FURNACES & OVENS
035690	GENERAL INDUSTRIAL MACH. NEC
035710	COMPUTING & ACCOUNTING MACHINES
035790	TYPEWRITERS & OTHER OFFICE MACHINES
035810	AUTOMATIC MERCHANDISING MACHINES
035850	REFRIGERATION EQUIPMENT
035860	MEASURING & DISPENSING PUMPS
035890	SERVICE INDUSTRY MACHINES NEC
035900	MACHINE SHOP PRODUCTS

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Continued)

036110	ELECTRIC MEASURING INSTRUMENTS
036120	TRANSFORMERS
036130	SWITCHGEAR & SWITCHBOARD APPARATUS
036210	MOTORS & GENERATORS
036220	ELECTRICAL INDUSTRIAL CONTROLS
036240	CARBON & GRAPHITE PRODUCTS
036290	ELECTRIC INDUSTRIAL APPARATUS, NEC
036310	HOUSEHOLD COOKING EQUIPMENT
036320	HOUSEHOLD REFRIGERATORS
036330	HOUSEHOLD LAUNDRY EQUIPMENT
036390	OTHER HOUSEHOLD APPLIANCES
036410	ELECTRIC LAMPS
036420	LIGHTING FIXTURES
036430	CURRENT-CARRYING WIRING DEVICES
036440	NONCURRENT-CARRYING WIRING DEVICES
036510	RADIO & TV RECEIVING SETS
036520	PHONOGRAPH RECORDS
036610	TELEPHONE & TELEGRAPH APPARATUS
036620	RADIO & TV COMMUNICATION EQUIPMENT
036710	RADIO & TV TUBES, RECEIVING TYPE
036720	CATHODE RAY PICTURE TUBES
036730	ELECTRON TUBES, TRANSMITTING TYPE
036790	ELECTRONIC COMPONENTS, NEC
036910	STORAGE BATTERIES
036920	PRIMARY BATTERIES
036940	ENGINE ELECTRICAL EQUIPMENT
036990	X-RAY & OTHER MISC. ELEC. EQUIP.
037150	TRUCK TRAILERS
037170	MOTOR VEHICLES & PARTS
037210	AIRCRAFT
037220	AIRCRAFT ENGINES & ENGINE PARTS
037290	OTHER AIRCRAFT PARTS & EQUIPMENT
037310	SHIP BUILDING & REPAIRING
037320	BOAT BUILDING & REPAIRING
037410	LOCOMOTIVES & PARTS
037420	RAILROAD & STREET CARS
037510	MOTORCYCLES & BICYCLES
037910	TRAILER COACHES <del>==ECP</del>
037990	MISC. TRANSPORTATION EQUIPMENT
038110	SCIENTIFIC INSTRUMENTS

MANUFACTURING INDUSTRIES

for which

CAPITAL COEFFICIENTS

Have Been Developed (Concluded)

038210	MECHANICAL MEASURING DEVICES
038220	AUTOMATIC TEMPERATURE CONTROLS
038400	MEDICAL & DENTAL INSTRUMENTS
038510	OPTICAL & OPHTHALMIC GOODS
038610	PHOTOGRAPHIC EQUIPMENT
038700	WATCHES, CLOCKS & PARTS
039100	JEWELRY & SILVERWARE
039310	MUSICAL INSTRUMENTS & PARTS
039410	TOYS & CHILDRENS VEHICLES
039490	SPORTING & ATHLETIC GOODS
039500	OFFICE & ARTISTS MATERIALS
039800	MISC. MANUFACTURED PRODUCTS

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in  
CAPITAL COEFFICIENTS

001920	HORTICULTURAL SPECIALTIES
014210	CRUSHED,- BROKEN STONE
014410	SAND, GRAVEL
02294A	OAKUM
02421A	LUMBER, DRESSED
02421B	LUMBER, ROUGH OR SURFACED
02421C	RR TIES, SAWED
024310	MILLWORK, WOOD
024320	PLYWOOD
02491A	POLES, CROSSARMS, TREATED
02499A	PALLET, SKID
02499B	INSULATION, CORK
02499C	TANK, VAT, WOOD
025210	FURNITURE, OFFICE, WOOD
025220	FURNITURE, OFFICE, METAL
025410	PARTITION, LOCKER, FIXT., OFFICE, WOOD
025420	PARTITION, LOCKER, FIXT., OFFICE, METAL
025990	FURNITURE, FIXT.,NEC.-HOSP., CAFE., OTHER
02649A	WALLBOARD PAPER
02661A	INSULATING BOARD
02661B	CONSTRUCTION PAPER
02819A	CHEMICAL CATALYTIC PREPARATIONS
02819B	REAGENT, HI GRADE INORGANIC CHEMICALS
028510	PAINT, VARNISH, LACQUER, ENAMEL
028520	PUTTY, CAULKING
028610	GUM & WOOD CHEMICALS
029510	PAVING MIXTURES, BLOCKS
029520	ROOFING FELTS, COATINGS
03079A	PACKING FABRICATED, PLASTIC
032110	FLAT GLASS
032410	CEMENT, PORTLAND
032510	BRICK, STRUCTURAL CLAY TILE
032530	TILE, CERAMIC
032550	REFRACTORIES, CLAY
03259A	FLUE LINING
03259B	PIPE, CHIMNEY LINING, CLAY
03259C	PIPE, SEWER, CLAY
032610	PLUMBING FIXTURES, VITREOUS
032640	ELECTRICAL SUPPLIES, PORCELAIN
032710	BLOCK, CONCRETE

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in  
CAPITAL COEFFICIENTS (Continued)

032720	TANK, STORAGE, CONCRETE
03272A	CONDUIT, CONCRETE
032730	CONCRETE, READY-MIXED
032740	LIME
032750	GYPSUM PRODUCTS
032810	STONE, CUT
032910	ABRASIVE PRODUCTS
032920	ASBESTOS PRODUCTS
03292A	ASBESTOS BUILDING PRODUCTS
032930	GASKET, PACKING
03293A	INSULATION, PIPE
03295A	MAGNESIA, MAGNESITE, DEAD BURNED
032960	INSULATION, MINERAL WOOL
032970	REFRACTORIES, NONCLAY
03312A	PIPE, TUBE, PROD. IN STEEL MILL, STEEL
03312B	WIRE, STEEL, PROD, IN STEEL MILL
03312C	RAILS, IRON, STEEL
03315A	NAILS, SPIKES
033170	PIPE, STEEL
03321A	PIPE, PRESSURE, CAST IRON
03321B	PIPE, SOIL, CAST IRON
03321C	CASTINGS, GREY IRON
03341A	LEAD, REFINED
03351A	PIPE, TUBE, COPPER
03352A	TUBE, ALUMINUM
033560	PIPE, TUBE, OTHER NONFERROUS
03357A	WIRE, CABLE, COMMUNICATION
03357B	WIRE, CABLE, POWER
03357C	WIRE, CABLE, OTHER INSULATED, NEC
03357D	WIRE, NONFERROUS, BARE, INSULATED
033910	FORGINGS, IRON, STEEL
034230	TOOLS, EDGE, HAND
034250	SAWS, HAND
03429A	HARDWARE, TRANSPORTATION EQUIP.
03429B	HARDWARE, BUILDERS
034310	SANITARY WARE, ENAMELED
03433A	BURNERS, OIL, INDUSTRIAL
03433B	BOILERS, STEEL, HEATING, 15 PSI & UNDER
03433C	RADIATORS, CAST IRON
03433D	HEATERS, UNIT

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

034410	STRUCTURAL STEEL, FABRICATED
034420	DOORS, SASH, FRAMES, METAL
03443A	PLATE WORK, FABRICATED
03443B	HEAT EXCHANGER, BARE TUBE
03443C	HEAT EXCHANGER, FIN TUBE
03443D	CONDENSER, STEAM
03443E	BOILER, STEEL, POWER, OVER 15 PSI
03443F	STACK, SMOKE OR OTHER
03443G	TANK, METAL, COMPLETE AT FACTORY
03443H	TANK, VESSEL, METAL, CUSTOM MADE
03444A	CANOPY, HOOD, METAL
03444B	SHEET METAL WORK, OTHER
03444C	ROOFING, METAL
03444D	SIDING, METAL
03444E	GUTTERING
03444F	CULVERTS
03449A	ARCHITECTURAL MISC, METAL WORK
03449B	IRON, ORNAMENTAL
03449C	EXPANDED METAL
03449D	BAR JOISTS
03449E	REINFORCING RODS, FABRICATED
034510	SCREW MACHINE PRODUCTS
034520	BOLT, NUT, SCREW, RIVET, WASHER
03481A	FENCING, MADE FROM PURCHASED WIRE
03491A	BARREL, DRUM, SHIPPING, STEEL
034920	SAFE, VAULT
034940	VALVE, PIPE FITTINGS
034980	PIPE, FITTINGS, FABR, FROM PURCHASED PIPE
034990	PIPE, NIPPLES, FABRICATED
03511A	TURBINE, GENERATOR, STEAM, GAS, HYDRAULIC
03511B	TURBINE, STEAM ENGINE, ST, GAS, HYDRAULIC
03519A	ENGINES, GASOLINE, EXCL OUTBD. AIR. AUTO
03519B	ENGINES, DIESEL, EXCL. OUTBD. AIR, AUTO
03519C	ENGINES, GAS, EXCL. OUTBD. AIR. AUTO
03519D	ENGINES, OTHER, EXCL OUTBD AIR. AUTO
03532A	MINING M & E, UNDERGROUND
03532B	CRUSHING, PULVERIZING, SCREENING M&E
03532C	MINING M&E, ALL OTHERS
035330	OILFIELD M&E EXCL PUMP
03534A	ELEVATOR, FREIGHT, ELECTRIC

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

03534B	ELEVATOR, FREIGHT, HYDRAULIC
03534C	LIFTS, AUTO, SERVICE STATION TYPE
035350	CONVEYOR
03536A	HOIST
03536B	CRANE, MONORAIL, OVERHEAD TRAVELING
035370	TRUCK, TRACTOR, INDUSTRIAL
035410	MACHINE TOOL, METAL CUTTING
035420	MACHINE TOOL, METAL WORKING
035440	DIE, TOOL, J'G, MOLD
035450	MACHINE TOOL ATTACHMENTS
03548A	ROLLING MILL M&E
03548B	TOOL, HAND, POWER DRIVEN
03548C	WELDING, CUTTING APPARATUS, ACETYLENE
03548D	MAINTENANCE EQUIP, AUTO
03548E	METAL WORKING EQUIP, OTHER
03551B	COMMERCIAL FOOD PREPARATION M&E OTHER
03551D	FRUIT, VEGT, CANNING M&E PACK
03551E	FRUIT, VEGT, CAN, M&E WRAP, FILL, SEAL
03551F	FRUIT, VEGT, CANNING M&E, ALL OTHER
03551G	FLOUR, GRAIN MILL M&E
03551H	SUGAR PLANT M&E, CANE, BEET
03551I	OTHER INDUSTRIAL FOOD PRODUCTS M&E
03551J	BOTTLING M&E, CARBONATOR
03551K	BOTTLING M&E, FILL, EXCL. DAIRY
03551L	BOTTLING M&E, BOTTLE WASH., EXCL. DAIRY
03551M	BOTTLING M&E, OTHER, EXCL. DAIRY
035520	TEXTILE INDUSTRY M&E
03553A	WOOD WORKING M&E EXCL. HOME SHOP
03554A	PULP, PAPER INDUSTRY M&E
03554B	PAPER BAG MAKING M&E
03554C	PAPER ENVELOPE MAKING M&E
03554D	PAPER CORRUGATED BOX MAKING M&E
03554E	PAPER BOX & CARTON MAKING M&E
03554F	PAPER TOILET & NAPKIN MAKING M&E
03554G	PAPER CONVERTING M&E, OTHER
035550	PRINTING TRADES M&E
03559A	CHEMICAL MANUFACTURING INDUSTRIES M&E
03559B	FOUNDRY M&E
03559C	PLASTICS WORKING M&E
03559D	RUBBER WORKING M&E

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

03559E	PETROLEUM REFINING M&E
03559F	AMMUNITION, EXPLOSIVES, LOADING M&E
03559G	CIGARETTES & CIGAR MAKING M&E
03559H	OTHER TOBACCO M&E
03559I	CLAY WORKING M&E
03559J	CEMENT MAKING M&E
03559K	CONCRETE PRODUCTS M&E, BLOCK
03559L	CONCRETE PRODUCTS M&E, OTHER
03559M	GLASS MAKING M&E, BOTTLE FORMING
03559N	GLASS MAKING M&E, OTHER
03559O	SHOE MAKING, REPAIRING M&E
03559P	COTTON GINNING M&E, COTTON GINS
03559Q	COTTON GINNING M&E, OTHER
03559R	METAL CLEANING, DEGREASING, DRYING M&E
03559S	OTHER SP. IND., M&E - MISC
03559T	KILN, CEMENT, WOOD, CHEM., FLUID FIRED
03559U	FURNACE, OVEN, KILN, OTHER NON MIL, PROC
0355AA	BUTTER MAKING M&E
0355AB	DOUGH MIXERS
0355AC	MEAT PACKING M&E
0355AS	INCANDESCENT LAMP MAKING M&E
0355BA	CHEESE MAKING M&E
0355BB	BAKERY OVENS, TRAVELING TRAY
0355BC	POULTRY & EGG PACKING M&E
0355BS	PAINT MAKING M&E
0355CA	OTHER MILK PRODUCTS M&E
0355CB	BAKERY OVENS, OTHER
0355CS	STONE WORKING M&E
0355DA	ICE CREAM FREEZING M&E
0355DB	BAKERY SLICING MACHINES
0355DS	HAT MAKING M&E
0355EA	DAIRY BOTTLING M&E
0355EB	BAKERY WRAPPING MACHINES
0355ES	LEATHER WORKING M&E
0355FA	DAIRY SEPARATORS
0355FB	BAKERY M&E OTHER
0355FS	JEWELRY MAKING M&E
0355GA	DAIRY PASTEURIZERS
0355GB	COMMERCIAL FOOD SLICERS
0355GS	PHARMACEUTICALS MAKING M&E

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in  
CAPITAL COEFFICIENTS (Continued)

0355HA	DAIRY HOMOGENIZERS
0355HB	COMMERCIAL FOOD GRINDERS, CUTTERS
0355HS	ELECTRON TUBE MAKING M&E
0355LB	COMMERCIAL FOOD MIXERS
0355LS	EXPLOSIVES MAKING M&E
0355JB	CANDY MAKING M&E
0355JS	ELECTRICAL INSTRUMENTS MAKING M&E
0355KB	GUM MAKING M&E
0355KS	ELECTRICAL TRANSFORMER MAKING M&E
0355LB	MAGARONI MAKING M&E
0355LS	ELECTRIC MOTOR & GENERATOR MAKING M&E
0355MB	COOKING OIL MAKING M&E
0355MS	ELECTRICAL CONTROLS MAKING M&E
0355NB	FLAVORINGS MAKING M&E
0355NS	OTHER ELECTRICAL INDL, MAKING M&E
0355OB	SOFT DRINKS MAKING M&E
0355OS	RADIO, TV RECEIVING MAKING M&E
0355PB	DISILLED LIQUOR MAKING M&E
0355PS	PHONOGRAPH RECORDS MAKING M&E
0355QB	WINE MAKING M&E
0355QS	TELEPHONE & TELEGRAPH MAKING M&E
0355RB	MALT MAKING M&E
0355RS	RADIO, TV COMMUNICATIONS MAKING M&E
0355SS	ELECTRONICS NEC, MAKING M&E
0355TB	STAPLED MAKING M&E
0355TS	GLASS GRINDING M&E
0355UB	PICKLES, SAUCES MAKING M&E
0355US	ELECTROLYTIC M&E
03561A	PUMP, INDUSTRIAL
03561B	PUMP & MOTOR, HYDRAULIC FLUID POWER
03561C	COMPRESSOR, AIR, GAS EXCL. REFRIG, COMPR.
03561D	PUMP, COMPRESSOR INC OILFL, EXCL. REFRIG
03564A	FAN, BLOWER, INDUSTRIAL
03564B	DUST COLLECTION, AIR PURIFICATION
035660	POWER TRANSMISSION EQUIP
03567A	FURNACE, OVEN, METAL PROCESS ELECTRIC
03567B	FURNACE, OVEN, METAL PROCESS FLUID FIRED
03567C	HEATING EQUIP, HI-FREQUENCY INDUCTION
03569A	PACKAGE, WRAPPING M&E EXCL. FOOD, TOB.
03569B	ALL OTHER GENL, M&E

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

035700	COMPUTING, ACC'G. MACHINES, OFFICE
03576A	SCALE, RR TRACK, MOTOR TRUCK
03576B	SCALE, INDUSTRIAL, BENCH PORTABLE
03576C	SCALE, INDUSTRIAL, BUILT-IN
03576D	SCALE, INDUSTRIAL, PRE-DETERMINED WGT
03576E	SCALE, INDUSTRIAL, TANK, HOPPER, MISC.
035820	LAUNDRY, DRY CLEANING M&E
035840	VACUUM CLEANER, INDUSTRIAL
03585A	REFRIGERATION EQUIPMENT, INDUSTRIAL
03589A	COOKING, FOOD WARMING M&E, COMMERCIAL
03589B	WATER SOFTENER
036110	INSTRUMENTS, ELECTRICAL MEASURING
036120	TRANSFORMERS, POWER DISTRIBUTION
036130	SWITCHGEAR, SWITCHBOARD APPARATUS
03613A	PANEL BOARDS, ENTRANCE SWITCHES
03621A	MOTOR, ELECTRIC, FRACTIONAL HP
03621B	MOTOR, ELECTRIC, INTEGRAL HP
03621C	GENERATOR, ELECTRIC, PRIME MOVER
03621D	MOTOR GENERATOR, ELECTRIC
036220	ELECTRIC CONTROLS, INDUSTRIAL
036230	WELDING APPARATUS, ELECTRIC
036290	ELECTRICAL INDUSTRIAL GOODS NEC
03636A	SEWING M&E, INDL, EXCL. SHOE
036420	FIXTURES, ELECTRICAL
036430	WIRING DEVICE, CURRENT-CARRYING
03644A	CONDUIT, FITTING, ELECTRICAL
03644B	WIRING DEVICE, NONCURRENT-CARRYING
03662A	INTERCOMMUNICATION EQUIPMENT
036910	BATTERY, STORAGE
037150	TRAILER, TRUCK
03717A	AUTOMOBILE, PASSENGER
03717B	TRUCK TRACTOR
03741A	LOCOMOTIVE, INDL, MINING, DIESEL
03741B	LOCOMOTIVE, INDL, MINING, OTHER POWER
03742A	FREIGHT TRAIN CARS
03811A	INSTRUMENTS, ENGR., LAB., SCIENTIFIC
03821A	METERS, INTEGRATING
03821B	INSTRUMENTS, PROCESS, INDUSTRIAL
038220	TEMPERATURE CONTROLS, AUTOMATIC
038310	INSTRUMENTS, OPTICAL, LENSES

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in  
CAPITAL COEFFICIENTS (Continued)

038710	WATCHES, CLOCKS
03981A	BRUSHES, PAINT AND VARNISH
040000	RAILROAD TRANSPORTATION DEMAND
042000	MOTOR FREIGHT TRANSPORTATION DEMAND
048000	COMMUNICATION DEMAND
049000	ELECTRIC, GAS, WATER, SEWER DEMAND
060000	BANKING SERVICE
063100	LIFE INSURANCE SERVICE
063200	NONLIFE INSURANCE SERVICE
073100	ADVERTISING SERVICE
073900	CONSTRUCTION EQUIP, RENTAL SERVICE
080100	MEDICAL, PHYSICIAN SERVICE
080200	MEDICAL, CLINIC FIRST AID SERVICE
081000	LEGAL SERVICE
089100	ENGINEERING, ARCHITECTURAL SERVICE
3B0001	ACSRY 1--COMMUNAL PLBG, MIN LFG, SPOT HEAT
3B0002	ACSRY 2--COMMUNAL PLBG, STD LFG, RAD HEAT
3B0003	ACSRY 3--COMMUNAL PLBG, STD LFG, AIR HEAT
3B1111	ICSS, WOOD FRAME, NO BSMT, TYP 1, ACSRY 1
3B1321	ICSS, MSNRY WALL-BRG, NO BSMT, TYP 2 ACSRY 1
3B1322	ICSS, MSNRY WALL-BRG, NO BSMT, TYP 2 ACSRY 2
3B1331	ICSS, MSNRY WALL-BRG, NO BSMT, TYP 3 ACSRY 1
3B1332	ICSS, MSNRY WALL-BRG, NO BSMT, TYP 3 ACSRY 2
3B1342	ICSS, MSNRY WALL-BRG, BSMT, TYP 3, ACSRY 2
3B1453	ICSS, MSNRY WALL-BRG, BSMT, TYP 4, ACSRY 3
3B1532	ICSS, CONCRETE FRAME, NO BSMT, TYP 5, ACSRY 2
3B1542	ICSS, CONCRETE FRAME, BSMT, TYP 5, ACSRY 2
3B1543	ICSS, CONCRETE FRAME, BSMT, TYP 5, ACSRY 3
3B1552	ICSS, CONCRETE FRAME, BSMT, TYP 6, ACSRY 2
3B1553	ICSS, CONCRETE FRAME, BSMT, TYP 6, ACSRY 3
3B1611	ICSS, STEEL FRAME, NO BSMT, TYP 1 ACSRY 1
3B1612	ICSS, STEEL FRAME, NO BSMT, TYP 1 ACSRY 2
3B1621	ICSS, STEEL FRAME, NO BSMT, TYP 7, ACSRY 1
3B1622	ICSS, STEEL FRAME, NO BSMT, TYP 7, ACSRY 2
3B1631	ICSS, STEEL FRAME, NO BSMT, TYP 5, ACSRY 1
3B1632	ICSS, STEEL FRAME, NO BSMT, TYP 5, ACSRY 2
3B1711	ICSS, STEEL FRAME, NO BSMT, TYP 8, ACSRY 1
3B1712	ICSS, STEEL FRAME, NO BSMT, TYP 8, ACSRY 2
3B1721	ICSS, STEEL FRAME, NO BSMT, TYP 9, ACSRY 1
3B1722	ICSS, STEEL FRAME, NO BSMT, TYP 9, ACSRY 2

\*ICSS -- Industrial Construction, Single Story

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

3B1853	ICSS, STEEL FRAME, BSMT, TYP 6 ACSRY 3
3B2141	ICMS* MASONRY WALL BEARING, TYP 3 ACSRY 1
3B2142	ICMS, MASONRY WALL BEARING, TYP 3 ACSRY 2
3B2152	ICMS, MASONRY WALL BEARING, TYP 4, ACSRY 2
3B2153	ICMS, MASONRY WALL BEARING, TYP 4, ACSRY 3
3B2241	ICMS, CONCRETE FRAME, TYP 5 ACSRY 1
3B2242	ICMS, CONCRETE FRAME, TYP 5 ACSRY 2
3B2252	ICMS, CONCRETE FRAME, TYP 6 ACSRY 2
3B2253	ICMS, CONCRETE FRAME, TYP 6 ACSRY 3
3B2352	ICMS, STEEL FRAME, TYP 6, ACSRY 2
3B2353	ICMS, STEEL FRAME, TYP 6, ACSRY 3
3B2441	ICMS, STEEL FRAME, TYP 9, ACSRY 1
3B2442	ICMS, STEEL FRAME, TYP 9, ACSRY 2
3C1000	PLANT ON-SITE, OUTSIDE LINES
3C2000	PLANT ON-SITE, GENERAL FACILITIES
3C3000	INDUSTRIAL RAILROAD SYSTEMS EXTENSIVE
3C4000	INDUSTRIAL ROAD SYSTEMS EXTENSIVE
3C5000	INDUSTRIAL WATER WELL DRILLING
902000	MANAGERS
908000	LABORERS
910010	ACCOUNTANTS, AUDITORS
910120	CHEMICAL ENGINEERS
910130	CIVIL ENGINEERS
910140	ELECTRICAL ENGINEERS
910150	INDUSTRIAL ENGINEERS
910160	MECHANICAL ENGINEERS
910520	TECHNICIANS, OTHER
919990	OTHER ENGINEERS, TECHNICAL
932070	ACCOUNTING CLERKS
932080	BILLING MACHINE OPERATORS
932090	KEY PUNCH OPERATORS
932590	STENOS, TYPISTS
932600	OTHER CLERICAL WORKERS
950640	BOILERMAKERS
950700	BRICKLAYERS
950740	CARPENTERS
950840	CRANE OPERATORS
950870	ELECTRICIANS
950940	HEAVY EQUIPMENT OPERATORS
951020	INSPECTORS A

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\* ICMS -- Industrial Construction, Multiple Story

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in  
CAPITAL COEFFICIENTS (Continued)

951170	MACHINISTS
951210	MOTOR VEHICLE MECHANICS - REPAIRMEN
951250	OTHER MECHANICS - REPAIRMEN
951270	IRON WORKERS
951300	MILLWRIGHTS
951380	PAINTERS
951440	PIPEFITTERS
951640	SHEET METAL WORKERS
959990	INSULATION WORKERS
961800	TRUCK DRIVERS
961870	INSPECTORS P
962020	WELDERS
969990	CONCRETE FINISHERS
980010	EQUIP INSTALLATION MODULE-MISC, MATL
980020	EQUIP INSTALLATION MODULE-FOUNDATION MATL
980030	EQUIP INSTALLATION MODULE-ELECTRICAL MATL
980040	EQUIP INSTALLATION MODULE-PIPING MATL
980050	EQUIP INSTALLATION MODULE-INSTRUMENT MATL
980060	EQUIP INSTALLATION MODULE-DUCT MATL
980100	AUX FAC MODULE-WATER
980200	AUX FAC MODULE-STEAM GENERATING
980301	AUX FAC MODULE-ELECT, GEN/TRANSF, -BUILD
980302	AUX FAC MODULE-ELECT, TRANSFORMATION-BUY
980400	AUX FAC MODULE-AIR
980500	AUX FAC MODULE REFFIGERATION & COOLING
980601	AUX FAC MODULE-INDUSTRIAL GAS-BUILD
980602	AUX FAC MODULE-INDUSTRIAL GAS-BUY
980701	AUX FAC MODULE PRODUCT STORAGE-SOLIDS
980702	AUX FAC MODULE-PRODUCT STORAGE-FLUIDS
980800	AUX FAC MODULE-WASTE DISPOSAL
980900	AUX FAC MODULE-ADMINISTRATION & SHOPS
981000	AUX FAC MODULE CONTROL LABORATORIES
981100	AUX FAC MODULE-DOCK
981400	AUX FAC MODULE-DISTRIBUTIVE COST
990100	FIELD DISTRIBUTIVE LABOR
990103	CORPORATE MANAGEMENT LABOR
990111	EQUIPMENT INSTALLATION LABOR-XF 1.1
990112	EQUIPMENT INSTALLATION LABOR-XF 1.2
990113	EQUIPMENT INSTALLATION LABOR-XF 1.3
990114	EQUIPMENT INSTALLATION LABOR-XF 1.4

## EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Continued)

990115	EQUIPMENT INSTALLATION LABOR-XF 1.5
990116	EQUIPMENT INSTALLATION LABOR-XF 1.6
990117	EQUIPMENT INSTALLATION LABOR-XF 1.7
990118	EQUIPMENT INSTALLATION LABOR-xf 1.8
990119	EQUIPMENT INSTALLATION LABOR-XF 1.9
990120	EQUIPMENT INSTALLATION LABOR-XF 2.0
990121	EQUIPMENT INSTALLATION LABOR-XF 2.1
990122	EQUIPMENT INSTALLATION LABOR-XF 2.2
990123	EQUIPMENT INSTALLATION LABOR-XF 2.3
990124	EQUIPMENT INSTALLATION LABOR-XF 2.4
990125	EQUIPMENT INSTALLATION LABOR-XF 2.5
990126	EQUIPMENT INSTALLATION LABOR-XF 2.6
990127	EQUIPMENT INSTALLATION LABOR-XF 2.7
990128	EQUIPMENT INSTALLATION LABOR-XF 2.8
990151	CONSTRUCTION LABOR-3B1111
990152	CONSTRUCTION LABOR-3B1321
990153	CONSTRUCTION LABOR-3B1322
990154	CONSTRUCTION LABOR-3B1331
990155	CONSTRUCTION LABOR-3B1332
990156	CONSTRUCTION LABOR-3B1342
990157	CONSTRUCTION LABOR-3B1453
990158	CONSTRUCTION LABOR-3B1532
990159	CONSTRUCTION LABOR-3B1542
990160	CONSTRUCTION LABOR-3B1543
990161	CONSTRUCTION LABOR-3B1552
990162	CONSTRUCTION LABOR-3B1553
990163	CONSTRUCTION LABOR-3B1611
990164	CONSTRUCTION LABOR-3B1612
990165	CONSTRUCTION LABOR-3B1621
990166	CONSTRUCTION LABOR-3B1622
990167	CONSTRUCTION LABOR-3B1631
990168	CONSTRUCTION LABOR-3B1632
990169	CONSTRUCTION LABOR-3B1711
990170	CONSTRUCTION LABOR-3B1712
990171	CONSTRUCTION LABOR-3B1721
990172	CONSTRUCTION LABOR-3B1722
990173	CONSTRUCTION LABOR-3B1853
990174	CONSTRUCTION LABOR-3B2141
990175	CONSTRUCTION LABOR-3B2142
990176	CONSTRUCTION LABOR-3B2152
990177	CONSTRUCTION LABOR-3B2153
990178	CONSTRUCTION LABOR-3B2241
990179	CONSTRUCTION LABOR-3B2242
990180	CONSTRUCTION LABOR-3B2252
990181	CONSTRUCTION LABOR-3B2253

EQUIPMENT, MATERIAL AND LABOR ITEMS

Represented in

CAPITAL COEFFICIENTS (Concluded)

990182	CONSTRUCTION LABOR-3B2352
990183	CONSTRUCTION LABOR-3B2353
990184	CONSTRUCTION LABOR-3B2441
990185	CONSTRUCTION LABOR-3B2442
990186	CONSTRUCTION LABOR-3C1000
990187	CONSTRUCTION LABOR-3C2000
990188	CONSTRUCTION LABOR-3C3000
990189	CONSTRUCTION LABOR-3C4000
990190	CONSTRUCTION LABOR-3C5000

**20119 MEAT PRODUCTS (EXPANSION)**

ITEM TITLE	ITEM CODE	LEADTIME MEAN:RANGE/2		FACTOR
<b>PROCESS</b>				
SPECIALIZED EQUIPMENT				
MEAT PACKING M & E	0355AC	4.25	1.75	.109180
<b>COMMON EQUIPMENT</b>				
CONTAINERS				
LUMBER, DRESSED	02421A	5.00	2.25	.009280
TANK, VAT, WOOD	02499C	4.75	2.25	.001090
TANK, METAL, CUSTOM MADE	03443H	4.25	1.75	.002730
NONMETAL HEATING OR COOLING				
FURNACE, OVEN, NONMETAL PROCESS	03559U	4.00	1.25	.015010
REFRIGERATION EQUIPMENT	03585A	4.50	2.25	.014740
HEATING AUXILIARY MATERIAL				
REFRACTORIES, CLAY	032550	3.75	1.75	.000820
BURNERS, OIL	03433A	4.00	1.75	.000270
TRANSPORTING SOLIDS				
ELEVATOR, FREIGHT, ELECTRIC	03534A	4.00	1.75	.001910
CONVEYOR	035350	3.50	1.50	.037670
HOIST	03536A	3.00	1.25	.007100
CRANE, MONORAIL	03536B	3.50	1.75	.012560
TRUCK, TRACTOR, INDUSTRIAL	035370	1.50	0.75	.002730
PUMPING FLUIDS				
PUMP	03561A	3.75	1.25	.004910
FAN, BLOWER	03564A	3.00	1.25	.006280
WEIGHING				
SCALE, BUILT-IN	03576C	2.50	0.75	.020470
DRIVERS PURCHASED SEPARATELY				
POWER TRANSMISSION EQUIPMENT	035660	3.25	1.50	.008730
MOTOR, ELECTRIC, INTEGRAL HP	03621B	3.50	1.50	.005730
MISCELLANEOUS INDUSTRIAL EQUIPMENT				
TOOL, HAND, POWER DRIVEN	03548B	1.50	0.75	.001360
OTHER GENERAL M & E	03569B	4.25	1.75	.001640
CLEANING				
DUST COLLECTION, ATR CONDITIONING	03564B	3.50	2.00	.007640
VACUUM CLEANER, INDUSTRIAL	035840	2.50	1.25	.001090
EQUIPMENT INSTALLATION MODULES				
MISC. EQUIPMENT MATERIAL	980010	5.25	3.25	.020120
FOUNDATION MATERIAL	980020	5.50	2.25	.006820
ELECTRICAL MATERIAL	980030	5.50	2.75	.012540
PIPING MATERIAL	980040	4.75	2.75	.016090
INSTRUMENT MATERIAL	980050	4.00	2.50	.005730
DUCT MATERIAL	980060	3.50	2.25	.002730
EQUIPMENT INSTALLATION LABOR	990115	4.50	3.75	.085620
<b>CONSTRUCTION MODULES</b>				
<b>BUILDINGS</b>				
ICMS, CONCRETE FRAME, TYPE 5, ACSRY 1	382241	4.75	4.00	.099450
<b>AUXILIARY FACILITY MODULES</b>				
AUX FAC MODULE - WATER	980100	5.50	2.50	.007670
AUX FAC MODULE - STEAM GENERATING	980200	5.25	2.50	.044160
AUX FAC MODULE - ELECT. GEN/TRANSF. -BUILD	980301	4.50	2.50	.022190
AUX FAC MODULE - ELECT. TRANSFORMATION-BUY	980302	2.75	0.50	.006000
AUX FAC MODULE - ATR	980400	3.25	1.00	.005220
AUX FAC MODULE - REFRIGERATION & COOLING	980500	3.75	1.50	.022450
AUX FAC MODULE - PRODUCT STORAGE - SOLIDS	980701	3.75	2.75	.046720
AUX FAC MODULE - WASTE DISPOSAL	980800	1.00	0.50	.001200
AUX FAC MODULE - ADMINISTRATION & SHOPS	980900	6.50	3.25	.034660
PLANT ON-SITE OUTSIDE LINES	3C1000	4.25	2.50	.046150
PLANT ON-SITE GENERAL FACILITIES	3C2000	5.50	5.50	.025790
AUX FAC MODULE - DISTRIBUTIVE COST	981400	8.00	8.00	.215750
<b>TOTAL PLANT COST</b>				<b>1.000000</b>

Industry Statistics

Ratio of Fixed Capital to annual Output Capacity for new plants, end 1957----- 0.117  
 Book Value per Plant (\$ 000)  
 \*Large--- 1,432 #Small--- 67  
 New Plant Construction Time (Mos.)  
 On-Site Construction Only  
 \*Large--- 10.75 #Small--- 6.00  
 Incl. Design & Procurement  
 \*Large--- 16.00 #Small--- 9.00  
 \*Large Plants:----- ≥ 50 Employees  
 #Small Plants:----- < 50 Employees

Concordance: NPA codes to SIC

NPA: 20119 - Meat Products (Expansion)  
 SIC: 2011, 2013

Industry Contents

**SIC 2011**  
 Establishments primarily engaged in the slaughtering, for their own account or on a contract basis for the trade, of cattle, hogs, sheep, lambs, calves, horses, and other animals except small game, for meat to be sold or to be used on the same premises in canning and curing, and in making sausage, lard, and other products.

**SIC 2013**  
 Establishments primarily engaged in manufacturing sausages, cured meats, smoked meats, canned meats, frozen meats, other prepared meats, and meat specialties, from purchased carcasses and other materials. Sausage kitchens and other prepared meat plants operated by packing houses as separate establishments also are included in this industry. Establishments primarily engaged in the cutting up and resale of purchased fresh carcasses are not included.

## EQUIPMENT INSTALLATION MODULES

### 980010: EQUIPMENT INSTALLATION MODULE - MISCELLANEOUS MATERIAL

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN:RANGE/2		
CORK INSULATION	02499B	0.00	0.00	.030000
PAINTS, VARNISHES, LACQUERS, ENAMELS	028510	0.00	0.00	.140000
CHEMICAL SOLVENTS, TURPENTINE	028610	0.00	0.00	.020000
FABRICATED PLASTIC PACKING	03079A	0.00	0.00	.010000
ASBESTOS PRODUCTS	032920	0.00	0.00	.210000
GASKETS, PACKING	032930	0.00	0.00	.040000
MINERAL WOOL FOR INSULATION	032960	0.00	0.00	.360000
SCREW MACHINE PRODUCTS	034510	0.00	0.00	.020000
BOLTS, NUTS, SCREWS, RIVETS, WASHERS	034520	0.00	0.00	.130000
BRUSHES, PAINT & VARNISH	03981A	0.00	0.00	.040000
TOTAL				1.000000

### 980020: EQUIPMENT INSTALLATION MODULE - FOUNDATION MATERIAL

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN:RANGE/2		
BRICK, STRUCTURAL CLAY TILE	032510	0.00	0.00	.120000
READY MIXED CONCRETE	032730	0.00	0.00	.340000
FABRICATED STRUCTURAL IRON, STEEL	034410	0.00	0.00	.290000
FABRICATED PLATE WORK	03443A	0.00	0.00	.160000
ARCHITECTURAL MISC. METAL WORK	03449A	0.00	0.00	.090000
TOTAL				1.000000

### 980030: EQUIPMENT INSTALLATION MODULE - ELECTRICAL MATERIAL

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN:RANGE/2		
PORCELAIN ELECTRICAL SUPPLIES	032640	0.00	0.00	.030000
COMMUNICATION WIRE, CABLE	03357A	0.00	0.00	.020000
POWER WIRE, CABLE	03357B	0.00	0.00	.320000
OTHER INSULATED WIRE, CABLE, NEC	03357C	0.00	0.00	.160000
SWITCHGEAR, SWITCHBOARD APPARATUS	036130	0.00	0.00	.080000
INDUSTRIAL ELECTRICAL CONTROLS	036220	0.00	0.00	.130000
CURRENT-CARRYING WIRING DEVICES	036430	0.00	0.00	.070000
ELECTRICAL CONDUIT, FITTINGS	03644A	0.00	0.00	.120000
OTHER NON CURRENT-CARRYING WIRING DEVICES	03644B	0.00	0.00	.020000
INTERCOMMUNICATION EQUIPMENT	03662A	0.00	0.00	.050000
TOTAL				1.000000

### 980040: EQUIPMENT INSTALLATION MODULE - PIPING MATERIAL

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN:RANGE/2		
CORK INSULATION	02499B	0.00	0.00	.020000
ASBESTOS PRODUCTS	032920	0.00	0.00	.075000
GASKETS, PACKING, PIPE COVERING	032930	0.00	0.00	.030000
MINERAL WOOL FOR INSULATION	032960	0.00	0.00	.125000
STEEL PIPE, TUBE, PRODUCED IN STEEL MILL	03312A	0.00	0.00	.176000
CAST IRON PRESSURE PIPE	03321A	0.00	0.00	.135000
COPPER PIPE, TUBE	03351A	0.00	0.00	.101000
ALUMINUM TUBE	03352A	0.00	0.00	.009000
OTHER NONFERROUS PIPE, TUBING	033560	0.00	0.00	.002000
VALVES, PIPE FITTINGS	034940	0.00	0.00	.300000
FABR. PIPE, FITTINGS, FROM PURCH. PIPE	034980	0.00	0.00	.027000
TOTAL				1.000000

#### Purpose

These six equipment installation modules are provided to accept the demand for materials required to make the equipment operable, and then distribute demand to interrelated sets of material-producing industries.

Demand for these modules originates from Industry Expansion tables and Auxiliary Facility modules.

#### Factors

980010: Miscellaneous material  
A constant factor of 4.76% of the total installed equipment cost provides for these materials.

980020/980060: Other materials  
Factors were derived from empirical relationships between each type of equipment and its need for each of the five groups of external installation materials.

#### Leadtimes

Modular input leadtimes are zero. Input leadtimes assume the leadtimes of the originating demand for the module found in the Industry Expansion tables and Auxiliary Facility modules.

#### References

Empirical Development, Section \_\_\_  
Adjusting Factors, Section \_\_\_  
Example of Use, Section \_\_\_

#### Contents

Equipment to be placed in operating condition requires materials for stores items, foundation, wiring, piping, instrumentation, and duct. This set of modules lists these materials, for which the demand varies by the type of equipment being installed. Equipment processing solids usually requires heavy power wiring as contrasted to equipment processing fluids. Equipment processing fluids makes greater demands for piping and instruments than equipment processing solids. Modules of equipment installation materials are thus justified to show this varying demand by different types of process or power equipment.

#### Module Descriptions

980010: Miscellaneous Material  
Equipment insulation, packing, paint, nuts, bolts  
980020: Foundation Material  
Brick, concrete, steel  
980030: Electrical Material  
Power wiring, switchgear  
980040: Piping Material  
Pipe, valves, fittings, packing

## CONSTRUCTION MODULES

### 3B1111: ICSS, WOOD FRAME, NO BSMT, TYPE 1, ACSRY 1

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
SAND, GRAVEL	014410	0.00	0.00	.001500
LUMBER, ROUGH OR SURFACED	02421B	0.00	0.00	.130700
MILLWORK, WOOD	024310	0.00	0.00	.030200
PAINT, VARNISH, LACQUER, ENAMEL	028510	0.00	0.00	.009500
PUTTY, CAULKING	028520	0.00	0.00	.000600
FLAT GLASS	032110	0.00	0.00	.002200
CEMENT, PORTLAND	032410	0.00	0.00	.001200
BRICK, STRUCTURAL CLAY TILE	032510	0.00	0.00	.031699
BLOCK, CONCRETE	032710	0.00	0.00	.018500
CONCRETE, READY-MIXED	032730	0.00	0.00	.091000
LIME	032740	0.00	0.00	.001000
NAILS, SPIKES	03315A	0.00	0.00	.007000
CASTINGS, GREY IRON	03321C	0.00	0.00	.001200
HARDWARE, BUILDERS	03429B	0.00	0.00	.008500
DOORS, SASH, FRAMES, METAL	034420	0.00	0.00	.001700
ROOFING, METAL	03444C	0.00	0.00	.021600
SIDING, METAL	03444D	0.00	0.00	.018100
GUTTERING	03444E	0.00	0.00	.006200
REINFORCING RODS, FABRICATED	03449E	0.00	0.00	.009300
BOLTS, NUTS, SCREWS, RIVETS, WASHERS	034520	0.00	0.00	.010800
ACSRY 1--COMMUNAL PLBG, MIN LTG, SPOT HEAT	3B0001	0.00	0.00	.095600
CONSTRUCTION LABOR - 3B1111	990151	0.00	0.00	.502000
<b>TOTAL</b>				<b>1.000000</b>

### 3B1321: ICSS, MSNRY WALL-BRG, NO BSMT, TYPE 2, ACSRY 1

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
SAND, GRAVEL	014410	0.00	0.00	.000800
LUMBER, ROUGH OR SURFACED	02421B	0.00	0.00	.089800
MILLWORK, WOOD	024310	0.00	0.00	.007900
PAINT, VARNISH, LACQUER, ENAMEL	028510	0.00	0.00	.000800
PUTTY, CAULKING	028520	0.00	0.00	.000700
ROOFING FELTS, COATINGS	029520	0.00	0.00	.020700
FLAT GLASS	032110	0.00	0.00	.001200
CEMENT, PORTLAND	032410	0.00	0.00	.001000
BRICK, STRUCTURAL CLAY TILE	032510	0.00	0.00	.029200
BLOCK, CONCRETE	032710	0.00	0.00	.078500
CONCRETE, READY-MIXED	032730	0.00	0.00	.076000
GYPSUM PRODUCTS	032750	0.00	0.00	.010100
WIRE, STEEL, PRODUCED IN STEEL MILL	03312B	0.00	0.00	.005900
NAILS, SPIKES	03315A	0.00	0.00	.000800
HARDWARE, BUILDERS	03429B	0.00	0.00	.001000
STRUCTURAL STEEL, FABRICATED	034410	0.00	0.00	.009100
DOORS, SASH, FRAMES, METAL	034420	0.00	0.00	.000800
GUTTERING	03444E	0.00	0.00	.001500
BAR JOISTS	03449D	0.00	0.00	.007800
REINFORCING RODS, FABRICATED	03449E	0.00	0.00	.001900
BOLTS, NUTS, SCREWS, RIVETS, WASHERS	034520	0.00	0.00	.006600
ACSRY 1--COMMUNAL PLBG, MIN LTG, SPOT HEAT	3B0001	0.00	0.00	.082400
CONSTRUCTION LABOR - 3B1321	990152	0.00	0.00	.566000
<b>TOTAL</b>				<b>1.000000</b>

#### Purpose

These 35 building modules, series 3B, are provided to accept the demand for housing industrial equipment and personnel, and then distribute demand to interrelated sets of material-producing industries, building accessory modules (plumbing, heating, lighting) and direct construction labor modules.

The 5 nonbuilding construction modules, series 3C, are provided to accept the demand for nonbuilding construction (outside lines, general facilities, etc.) and then distribute the demand to interrelated sets of material-producing industries and to direct construction labor modules.

Demand for these modules originates from Industry Expansion tables and Auxiliary Facility modules.

#### Factors

Both modular demands and input components were empirically derived and normalized from extensive engineering experience.

#### Leadtimes

Modular input leadtimes are zero. Input leadtimes assume the leadtimes of the originating demand for the module found in the building module.

#### Reference

Empirical Development, Section  
Adjusting Factors, Section  
Example of Use, Section

#### Contents

Each building module represents a specified type of industrial building based on the following considerations:

#### Structure

Frame: Wood/Masonry/Concrete/Steel  
Loading: Standard/Heavy  
Floors: Single/Multiple  
Basement: None/With  
Roof: Pitched/Flat  
Cladding: Metal/Masonry  
Interior: Open/Finished  
Building Accessories  
Communal Plumbing, Minimum Lighting, Spot Heating  
Communal Plumbing, Standard Lighting, Radiator Heating  
Communal Plumbing, Standard Lighting, Air Heating

#### Module Descriptions

3B1111: ICSS, Wood Frame, No Basement, Type 1, ACSRY 1  
Wood frame, standard loading, single floor, no basement, pitched roof, metal cladding, open interior, communal plumbing, minimum lighting, spot heating

3B1321: ICSS, Masonry Wall Brg, No Basement, Type 2, ACSRY 1  
Masonry wall bearing frame, standard loading, single floor, no basement, pitched roof, open interior, communal plumbing, minimum lighting, spot heating

**BUILDING ACCESSORY MODULES**

**3B0001: ACSRY 1--COMMUNAL PLBG, MIN LTC, SPOT HEAT**

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
PIPE, CHIMNEY LINING, CLAY	03259B	0.00	0.00	.080000
ELECTRICAL SUPPLIES, PORCELAIN	032640	0.00	0.00	.002000
PIPE, STEEL	033170	0.00	0.00	.079000
PIPE, SOIL, CAST IRON	03321B	0.00	0.00	.118000
LEAD, REFINED	03341A	0.00	0.00	.004000
PIPE, TUBE, COPPER	03351A	0.00	0.00	.124000
WIRE, CABLE, POWER	03357B	0.00	0.00	.142000
SANITARY WARE, ENAMELED	034310	0.00	0.00	.041000
HEATERS, UNIT	03433D	0.00	0.00	.063000
VALVE, PIPE FITTINGS	034940	0.00	0.00	.061000
PIPE, NIPPLES, FABRICATED	034990	0.00	0.00	.081000
PANEL BOARDS, ENTRANCE SWITCHES	03613A	0.00	0.00	.025000
FIXTURES, ELECTRICAL	036420	0.00	0.00	.103000
CONDUIT, FITTING, ELECTRICAL	03644A	0.00	0.00	.077000
<b>TOTAL</b>				<b>1.000000</b>

**3B0002: ACSRY 2--COMMUNAL PLBG, STD LTC, RAD HEAT**

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
PIPE, CHIMNEY LINING, CLAY	03259B	0.00	0.00	.070000
PLUMBING FIXTURES, VITREOUS	032610	0.00	0.00	.038000
ELECTRICAL SUPPLIES, PORCELAIN	032640	0.00	0.00	.002000
INSULATION, PIPE	03293A	0.00	0.00	.018000
PIPE, STEEL	033170	0.00	0.00	.082000
PIPE, SOIL, CAST IRON	03321B	0.00	0.00	.110000
LEAD, REFINED	03341A	0.00	0.00	.005000
PIPE, TUBE, COPPER	03351A	0.00	0.00	.120000
WIRE, CABLE, POWER	03357B	0.00	0.00	.135000
SANITARY WARE, ENAMELED	034310	0.00	0.00	.030000
RADIATORS, CAST IRON	03433C	0.00	0.00	.060000
VALVE, PIPE FITTINGS	034940	0.00	0.00	.055000
PIPE, NIPPLES, FABRICATED	034990	0.00	0.00	.073000
PANEL BOARDS, ENTRANCE SWITCHES	03613A	0.00	0.00	.025000
FIXTURES, ELECTRICAL	036420	0.00	0.00	.102000
CONDUIT, FITTING, ELECTRICAL	03644A	0.00	0.00	.075000
<b>TOTAL</b>				<b>1.000000</b>

**3B0003: ACSRY 3--COMMUNAL PLBG, STD LTC, AIR HEAT**

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
PIPE, CHIMNEY LINING, CLAY	03259B	0.00	0.00	.069000
PLUMBING FIXTURES, VITREOUS	032610	0.00	0.00	.056000
ELECTRICAL SUPPLIES, PORCELAIN	032640	0.00	0.00	.002000
PIPE, STEEL	033170	0.00	0.00	.087000
PIPE, SOIL, CAST IRON	03321B	0.00	0.00	.105000
LEAD, REFINED	03341A	0.00	0.00	.004000
PIPE, TUBE, COPPER	03351A	0.00	0.00	.129000
WIRE, CABLE, POWER	03357B	0.00	0.00	.138000
SANITARY WARE, ENAMELED	034310	0.00	0.00	.051000
VALVE, PIPE FITTINGS	034940	0.00	0.00	.072000
PIPE NIPPLES, FABRICATED	034990	0.00	0.00	.069000
PANEL BOARDS, ENTRANCE SWITCHES	03613A	0.00	0.00	.025000
FIXTURES, ELECTRICAL	036420	0.00	0.00	.113000
CONDUIT, FITTING, ELECTRICAL	03644A	0.00	0.00	.080000
<b>TOTAL</b>				<b>1.000000</b>

Purpose

These 3 building accessory modules are provided to accept the demand for variable plumbing, lighting, and heating materials from the 35 building modules, series 3B, and distribute the demand to interrelated sets of material-producing industries.

Demand for these modules originates solely from the construction building modules.

Factors

Both modular demands and input components were empirically derived and normalized from extensive engineering experience.

Leadtimes

Modular input leadtimes are zero. Input leadtimes assume the leadtimes of the originating demand for the module found in the building module.

References

Empirical Development, Section \_\_\_  
Adjusting Factors, Section \_\_\_  
Example of Use, Section \_\_\_

Contents

Each accessory module represents specified type of industrial building service based on the following considerations:

Building Accessories  
Communal Plumbing  
Lighting: Minimum/Standard  
Heating: Spot/Radiator/Air

Module Descriptions

3B0001: Acry 1--Communal Plbg, Min Ltg, Spot Heat  
Communal plumbing, minimum lighting, spot heating  
3B0002: Acry 2--Communal Plbg, Std Ltg, Rad Heat  
Communal plumbing, standard lighting, radiator heating  
3B0003: Acry 3--Communal Plbg, Std Ltg, Air Heat  
Communal plumbing, standard lighting, air heating

980100 AUXILIARY FACILITY MODULE - WATER

980100: AUX FAC MODULE - WATER

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
TANK, VAT, WOOD	02499C	0.00	0.00	.020600
TANK, METAL, CUSTOM MADE	03443H	0.00	0.00	.089300
PUMP, INDUSTRIAL	03561A	0.00	0.00	.049300
POWER TRANSMISSION EQUIPMENT	035660	0.00	0.00	.012900
OTHER GENERAL EQUIPMENT	03569B	0.00	0.00	.005400
WATER SOFTENERS	03589B	0.00	0.00	.013400
MOTORS, ELECTRIC, FRACTIONAL HP	03621A	0.00	0.00	.003400
MOTORS, ELECTRIC, INTEGRAL HP	03621B	0.00	0.00	.019600
MISC. EQUIP. MATL. MODULE	980010	0.00	0.00	.012900
EQUIP. FOUNDATION MATL. MODULE	980020	0.00	0.00	.005000
EQUIP. ELECTRICAL MATL. MODULE	980030	0.00	0.00	.016000
EQUIP. PIPING MATL. MODULE	980040	0.00	0.00	.058000
EQUIP. INSTRUMENT MATL. MODULE	980050	0.00	0.00	.035000
EQUIP. DUCT MATL. MODULE	980060	0.00	0.00	.007000
EQUIP. INSTALLATION LABOR - XF 2.1	990121	0.00	0.00	.163000
ICSS, MSNRY WALL-BRG, NO BSMT, TYP 3, ACSRY 1	3B1331	0.00	0.00	.458000
INDUSTRIAL WATER WELL DRILLING	3C5000	0.00	0.00	.031200
TOTAL				1.000000

Purpose

This module provides facilities for the production, treatment, and storage of plant water in the event water is not purchased from an external source. The module accepts the demand for process and service water in terms of proportional cost of capitalized investment, and then distributes the demand to an interrelated set of equipment-producing industries, equipment installation modules and to construction modules.

Originating demand for the water module is found only in the Industry Expansion tables.

Factors

Industry demand for the water module represents U. S. 1959 source and production of water.

Gallons of water consumed were correlated with dollars of depreciable assets. The industry water coefficient was then proportioned by the amount of water privately produced of total. Thus, industry demand for the water module was computed.

Module component inputs were normalized from actual industrial experience.

Leadtimes

Modular input leadtimes are zero. Input leadtimes assume the leadtimes of the originating demand for the module found in the Industry Expansion tables.

References

Empirical Development, Section \_\_\_  
 Adjusting Factors, Section \_\_\_  
 Example of Use, Section \_\_\_

Content

Facilities included in this module are: Wells, Pump Houses, Water Treatment Plants, Water Softeners, Chlorination Houses, Reservoirs, Ponds, Water Storage Tanks (ground and elevated). Facilities include equipment and buildings.

Plant water transmission and distribution lines are not included in this module. These lines are provided for in the Plant On-Site Outside Lines Module.

LABOR MODULES

990102: FIELD DISTRIBUTIVE LABOR

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
MANAGERS	902000	0.00	0.00	.005440
LABORERS	908000	0.00	0.00	.003900
ACCOUNTANTS, AUDITORS	910010	0.00	0.00	.000820
CHEMICAL ENGINEERS	910120	0.00	0.00	.000330
CIVIL ENGINEERS	910130	0.00	0.00	.014520
ELECTRICAL ENGINEERS	910140	0.00	0.00	.002880
INDUSTRIAL ENGINEERS	910150	0.00	0.00	.000540
MECHANICAL ENGINEERS	910160	0.00	0.00	.003320
TECHNICIANS	910520	0.00	0.00	.000710
OTHER ENGINEERS, TECHNICIANS	919990	0.00	0.00	.002180
ACCOUNTING CLERKS	932070	0.00	0.00	.001030
BILLING MACHINE OPERATORS	932080	0.00	0.00	.001520
KEYPUNCH OPERATORS	932090	0.00	0.00	.000600
STENOS, TYPISTS	932590	0.00	0.00	.003150
OTHER CLERICAL WORKERS	932600	0.00	0.00	.009190
INSPECTORS A	951020	0.00	0.00	.000220
MOTOR VEHICLE MECHANICS/REPAIRMEN	951210	0.00	0.00	.000220
OTHER MECHANICS/REPAIRMEN	951250	0.00	0.00	.001580
TRUCK DRIVERS	961800	0.00	0.00	.001960
INSPECTORS B	961870	0.00	0.00	.000270
TOTAL				.054380

990103: CORPORATE MANAGEMENT LABOR

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
MANAGERS	902000	0.00	0.00	.001480
ACCOUNTANTS, AUDITORS	910010	0.00	0.00	.000290
ACCOUNTING CLERKS	932070	0.00	0.00	.000380
BILLING MACHINE OPERATORS	932080	0.00	0.00	.000560
KEYPUNCH OPERATORS	932090	0.00	0.00	.000210
STENOS, TYPISTS	932590	0.00	0.00	.001130
OTHER CLERICAL WORKERS	932600	0.00	0.00	.003340
TOTAL				.007390

990111: EQUIPMENT INSTALLATION LABOR - XF 1.1

ITEM TITLE	ITEM CODE	LEADTIME		FACTOR
		MEAN	RANGE/2	
LABORERS	908000	0.00	0.00	.070280
BOILERMAKERS	950640	0.00	0.00	.003170
CARPENTERS	950740	0.00	0.00	.051900
CRANE OPERATORS	950840	0.00	0.00	.017090
ELECTRICIANS	950870	0.00	0.00	.079140
HEAVY EQUIPMENT OPERATORS	950940	0.00	0.00	.004120
INSULATION WORKERS	950990	0.00	0.00	.007910
MACHINISTS	951170	0.00	0.00	.001580
MILLWRIGHTS	951300	0.00	0.00	.013300
PAINTERS	951380	0.00	0.00	.002850
PIPEFITTERS	951440	0.00	0.00	.032290
SHIP METAL WORKERS	951640	0.00	0.00	.015830
TRUCK DRIVERS	961800	0.00	0.00	.014560
WELDERS	962020	0.00	0.00	.002530
TOTAL				.316550

Purpose

This series of manhour modules is provided to accept labor cost demand, and to distribute this demand to 35 occupations in terms of manhours per labor dollar.

Demand for these modules originates in the 252 Industry Expansion tables, Auxiliary Facility Modules, and in the 40 Construction Modules.

Factors

All modular demands and component input factors were empirically derived and normalized from industrial experience. A special note should be made of the equipment installation labor modules. Factors were derived from empirical relationships between each type of equipment and its installation cost.

Leadtimes

Modular input leadtimes are zero. Input leadtimes assume the leadtimes of the originating demand for the module found in the Industry Expansion tables, Auxiliary Facility Modules, and Construction Modules.

References

Empirical Development, Section \_\_\_  
Average Hourly Earnings, Section \_\_\_  
Adjusting Factors, Section \_\_\_  
Example of Use, Section \_\_\_

Contents

Functionally, occupations filter into four groups: Field Distributive, Corporate Management, Equipment Installation, and Construction. Each is characterized by its particular pattern of occupations. The number of craftsmen within the equipment installation and construction modules varies as the materials vary, module by module. Craft occupations include all grades - apprentices to foremen.

Module Descriptions

990102: Field Distributive Labor  
On-site engineering, administrative, craft supervisory, stores and maintenance staff.

990103: Corporate Management Labor  
Off-site personnel engaged in investment activities. This capitalized cost is usually an allocation of management's total expense.

990111: Equipment Installation Labor - XF 1.1

On-site craftsmen engaged in installing a module of equipment whose weighted equipment expansion factor is 1.1