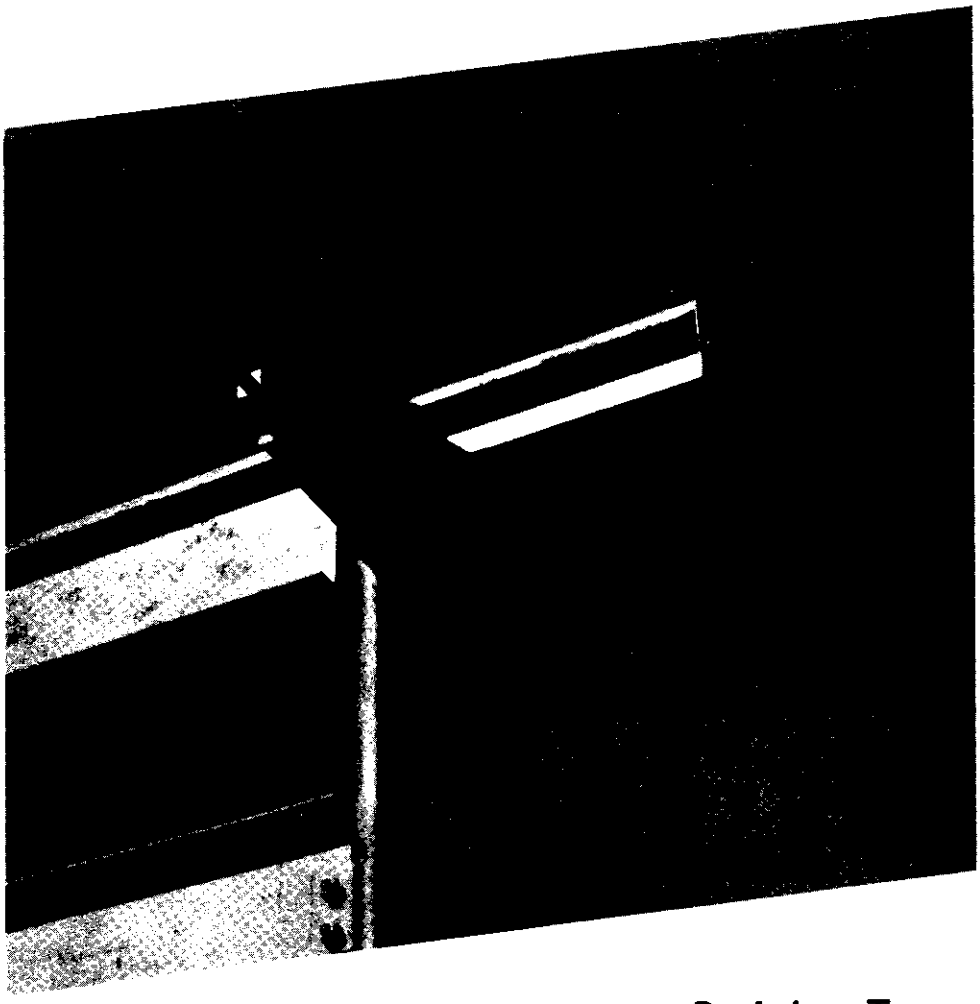
TECHNICAL PUBLICATION NO. 30

A Study of the Total Impact on Florida's Economy of the Construction Industry



G. Arlan Toy
David W. Perley
Mark T. Valin
W. David Mulkey

School of Building Construction
University of Florida
1984

TOTAL IMPACT
OF THE
CONSTRUCTION INDUSTRY
ON THE
FLORIDA ECONOMY

FOR PRESENTATION TO

BUILDING CONSTRUCTION INDUSTRY ADVISORY COMMITTEE

SCHOOL OF BUILDING CONSTRUCTION

UNIVERSITY OF FLORIDA

PRINCIPAL INVESTIGATOR: G. ARLAN TOY

CO-INVESTIGATOR: DR. DAVID MULKEY

GRADUATE ASSISTANTS: DAVID PERLEY

MARK VALIN

SUMMARY
A STUDY OF THE TOTAL IMPACT ON FLORIDA'S ECONOMY OF THE CONSTRUCTION INDUSTRY

As the title of this publication indicates many aspects of the construction industry and the economy of Florida are explored.

The following are the main points of the report:

1. All Florida economic indicators, and population have shown growth since 1970, with periods of slow or no growth shown only in the recessions of 74-76 and 81-82. Table 1-1.

2. Employment directly in construction accounted for 7.0% of total employment in 1982. Figure 1-4. This is nearly twice the employment in Agriculture, Forestry, and Fisheries. Construction employment is greater than employment in Transportation, Communication, and Public Utilities. It is greater than employment in Government (public administration, excluding government services). It is greater than employmnet in Wholesale trade. Employment in Finance, Insurance and Real Estate is approximately equal to employment in construction. It is only surpassed by Services; by Retail trade; and by Manufacturing.

3. Employment in construction is more volatile than that in other industry sectors. Figure 2-2.

4. Mining is approximately 30% construction related. Tables 2-2 and 2-3. Florida ranks 4th in the U.S in non-fuel mineral production. p46.

5. Approximately 12% of employment in manufacturing is construction related. p17.

6. Nearly 5% of wholesale and retail trade is construction related. p18.

7. Shares of Finance, insurance, real estate; Services; and Government are also construction related. Forestry (tree farming) is significantly construction related.

8. The shortfall in sales tax revenues in the 74-76 recession can be accounted for in the loss of tax revenue from the depressed construction industry.

A similar short fall was avoided in 81-82 by a 25% increase in the sales tax rate. Figures 2-10 and 2-11.

9. Nationwide, employment in construction has risen 3% from 1977 to 1982. In Florida it has risen 48%. p45, Table 2-1.

10. Single family housing is one of the more volatile subsectors of the construction industry being largely tied to the availabiltiy and cost of money. Figures 3-3, 3-4, 3-5. p52.

11. Residential contractors are more numerous in the counties along the I-4 Corridor. Map 3-1. p56.

12. Florida will have 5 areas in the nations top 20 housing markets in 1984: West Palm Beach, Tampa-St. Petersburg, Orlando, Fort Lauderdale, Miami. p57.

13. General contractors are most numerous in the Gold Coast counties, Pinellas, and Duval. Map 3-2.

14. Plumbing and Mechanical, Electrical, and Roofing contractors are concentrated in Duval, Pinellas, Hillsborough, Palm Beach, Broward, and Dade counties. Map 3-4, 3-5, and 3-6.

15. Distribution of contractor licenses by type and county is shown in Table 3-5, p84.

16. 1982 Employment, Total receipts, Value added, and Net receipts information for the various construction subsectors is summarized in Table 3-6, p85.

16. Pinellas, Polk, and Manatee counties lead in mobile home licenses for 82-83. Map 3-7.

17. The Sales multiplier resulting from the Input-Output analysis indicates that an increase of $1000 construction sales generates $2428 in sales to other sectors. p116

18. The Input-Output analysis indicated that output attributable to the consruction industry in Florida is 17%+ of the 1982 total output. Employment attributable to the construction is approximately 18% of the total Florida employment.

The overall impact of the construction industry on the economy in Florida is ENORMOUS.

For further summary information please read Chapter 6, pgs 122-127.

TABLE OF CONTENTS

INTRODUCTION

Few of Florida's citizens realize the impact that the construction industry has on the economy of the state. It is the purpose of this report to document the many ways that the construction industry is interrelated to all areas of Florida's economy. Data from a number of sources have been brought together in this report for the purpose of making them readily available to all interested parties. This research was funded under the provisions of Chapter 489.109 Florida Statutes and under the supervision of the Florida Building Construction Industry Advisory Committee.

The report has been organized as follows: Chapter 1 demonstrates the rapid growth of the state of Florida using such indicators as population, employment figures, personal income, and gross sales. The importance of the construction industry in these figures is discussed.

Chapter 2 details the importance of the construction industry in the Florida economy. In addition to construction's direct effect on the economy, the industry's impact on other industries, such as mining; wholesale and retail trade; finance, insurance, and real estate; and forestry is documented. The contribution of the construction industry to Florida's tax base is also detailed

Chapter 3 divides the construction industry into

several subsectors for further discussion. The impact of the construction industry on mining is considered. Data are presented on employment, total receipts, and value added for the years 1977 and 1982 for 10 major categories and 19 additional subcategories of the construction industry, as defined by the U.S. Census. These figures document the growth of the construction industry. Net receipts for 1982 are listed in actual dollar amounts to demonstrate the importance of construction. The distribution of licensed contractors in many of the categories is presented to demonstrate local impact of the construction industry in Florida counties. The mobile home industry in Florida is also discussed.

Chapter 4 introduces Input-Output analysis, a technique to describe economic interrelationships between industries. After discussing the techniques and goals of input-output analysis, the chapter proceeds to develop a construction based input-output model for the State of Florida.

Chapter 5 describes the results of the input-output analysis, and compares these results with the results of analyses from other states and individual Florida counties. The importance of the construction industry is seen in its impact on other segments of Florida's economy.

Finally, Chapter 6 summarizes the results of the analysis of the impact that the construction industry has on the Florida economy.

CHAPTER 1.

FLORIDA GROWTH

I. GROWTH INDICATORS

Florida is a growth state. Table 1-1 shows general growth trends since 1970. Florida population has grown 56%; gross sales have grown 369%; non-agricultural employment has grown 75%; and total state personal income has grown 379%.

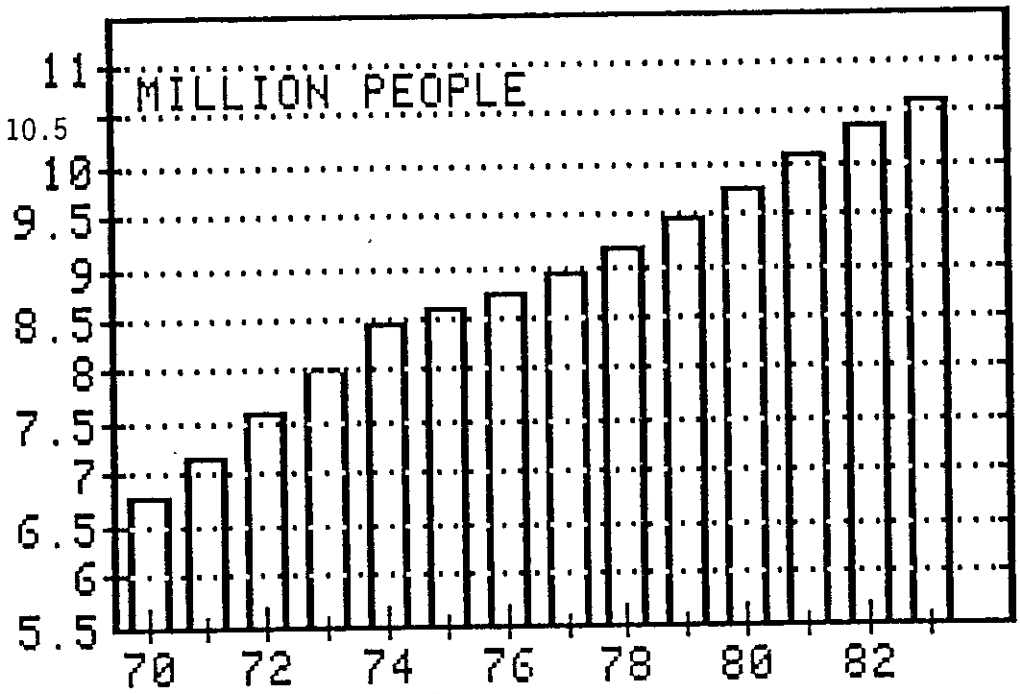
A general increase in mobility, a decrease in the workweek, and an increase in the standard of living, have greatly increased leisure time activities which has led to increased tourism in and retirement to Florida.

According to a July 1982 questionnaire, the top five reasons people visit Florida are; the climate, the rest and relaxation, visiting friends and relatives, Florida attractions, and the beaches.[2] People want to live here for the same reasons.

II. POPULATION TRENDS

Figure 1-1 shows Florida population growth since 1970. Migration into Florida has typically been the highest in the retirement age group. Individuals in this group have ended their career ties with their previous geographic area and are financially independent enough to make the move to

Florida. Other age groups have also been increasing in size in Florida. Industry has been moving to Florida bringing with it the need for a larger workforce. Florida also has lower overall taxes than most of the states from which our new residents move.

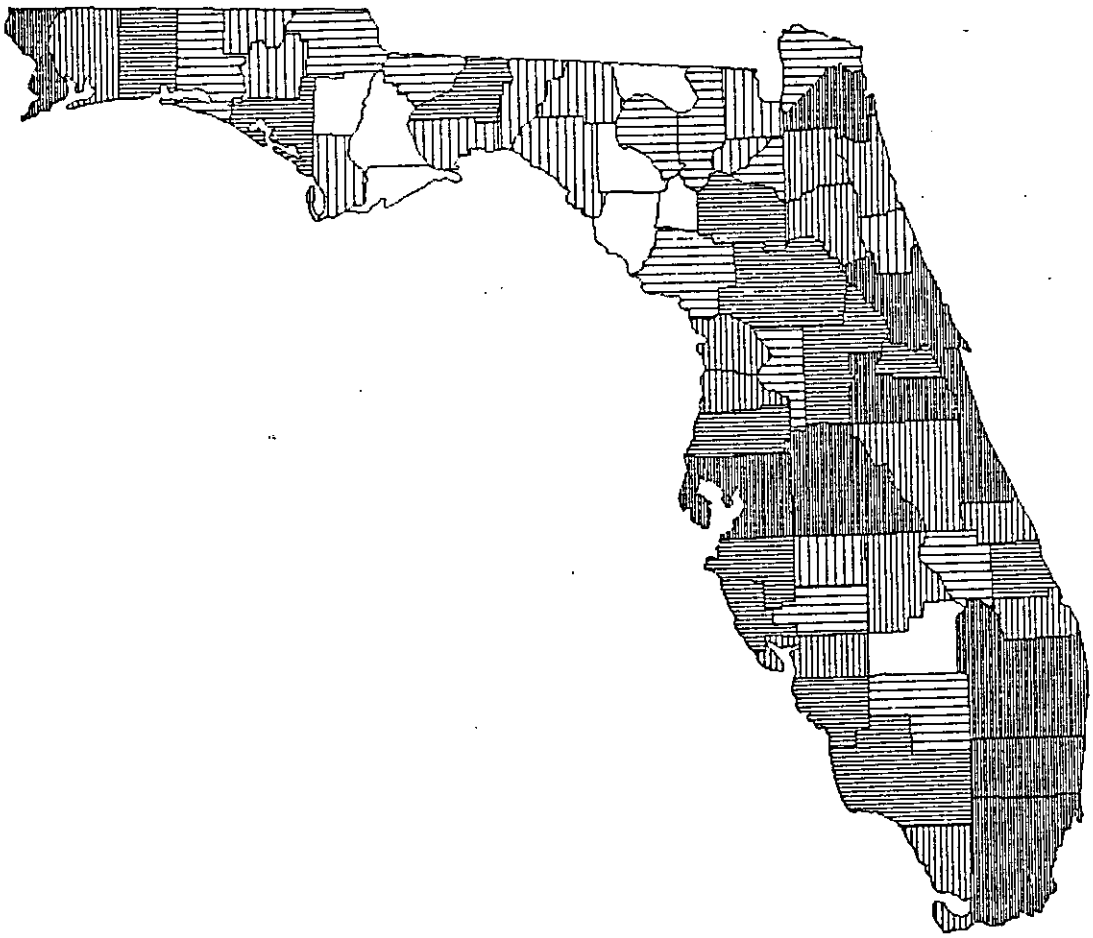


FLORIDA POPULATION GROWTH
1970 - 1983[3]
FIGURE 1-1

Another look at population growth Figure 1-1 finds a slower growth rate during the years 1974 through 1976. Population growth in Florida is affected by the general economic picture. The U.S. was in a recession during this period. People were less inclined to make a change.

Map 1-1 shows the population distribution in the State. The high density areas are the 'Gold Coast' of Southeast

ESTIMATED 1983 POPULATION[4]

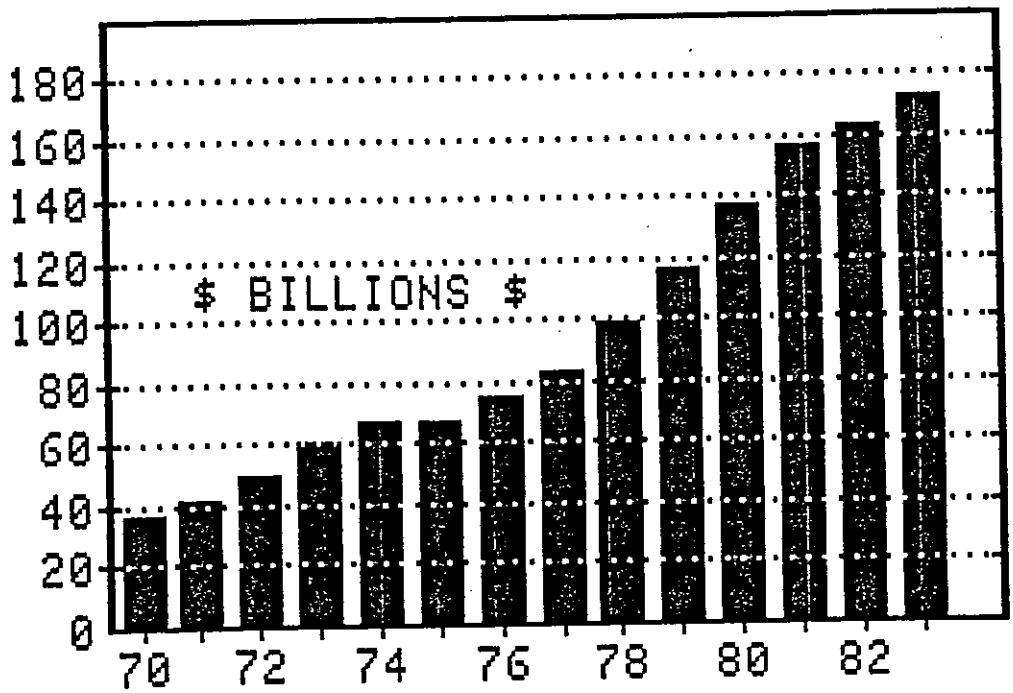


MAP 1-1

Florida, the 'I-4 Corridor' of Central Florida, Jacksonville in Northeast Florida, and Escambia county in West Florida.

III. SALES

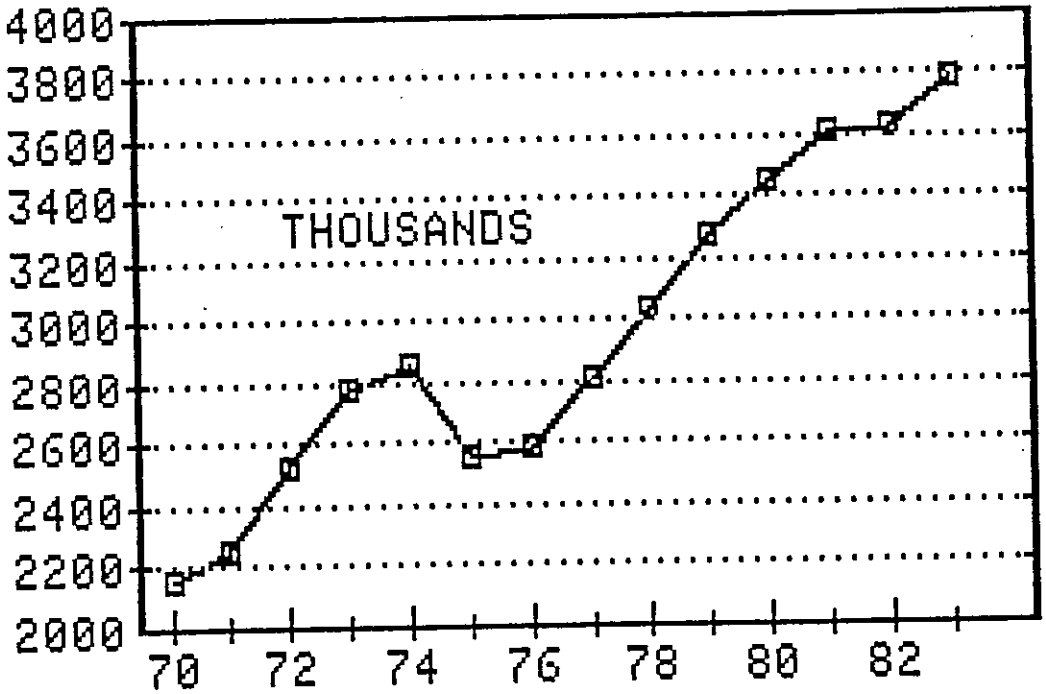
The consumer price index rose 149% from 1970 through 1982. During the corresponding period, gross sales in Florida rose 341%.[5] Figure 1-2 shows this increase graphically. Note the periods of slow or no growth, 1974-76 and 1981-82. There has, however, been substantial 'REAL' economic growth in Florida in the last fourteen years.



GROSS SALES
1970 - 1983
FIGURE 1-2 .

IV. EMPLOYMENT & PERSONAL INCOME

Total non-agricultural employment in Florida has grown from 2,155,000 in 1970 to 3,778,000 in 1983, an increase of 75%.[6] Figure 1-3 shows the growth in non-agricultural employment for the State. Note the decline in employment for 1974-76 and the level employment for 1981-82. Figure

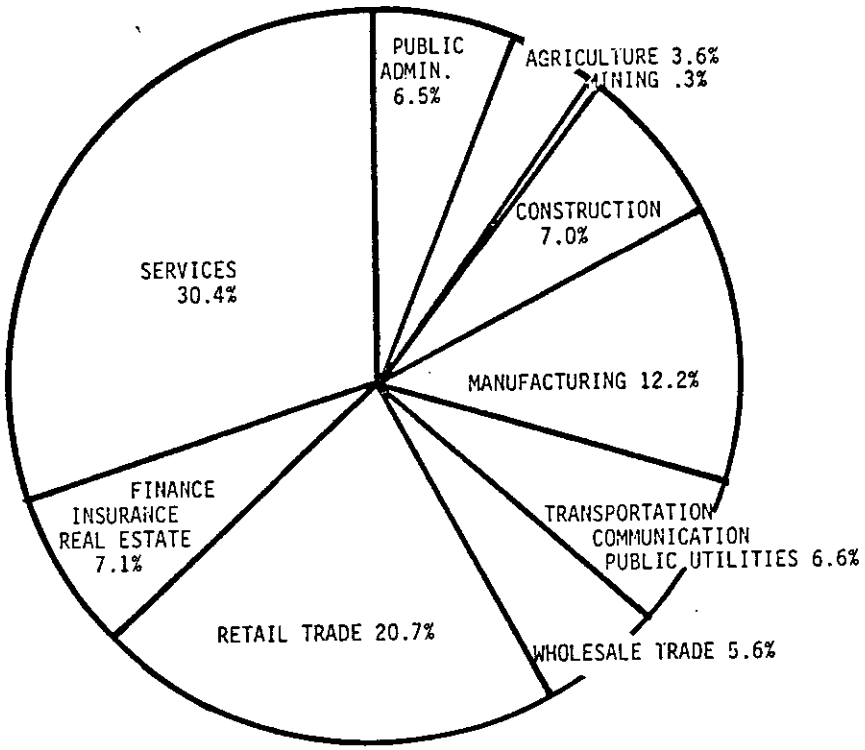


TOTAL STATE EMPLOYMENT[7]
1970 - 1983
FIGURE 1-3

1-4 shows the distribution of employment in the State for March 1982. Construction accounts directly for 7% of total employment. Services include some governmental services including educational and social services. Table 1-2, at the end of the chapter, gives the actual employment numbers

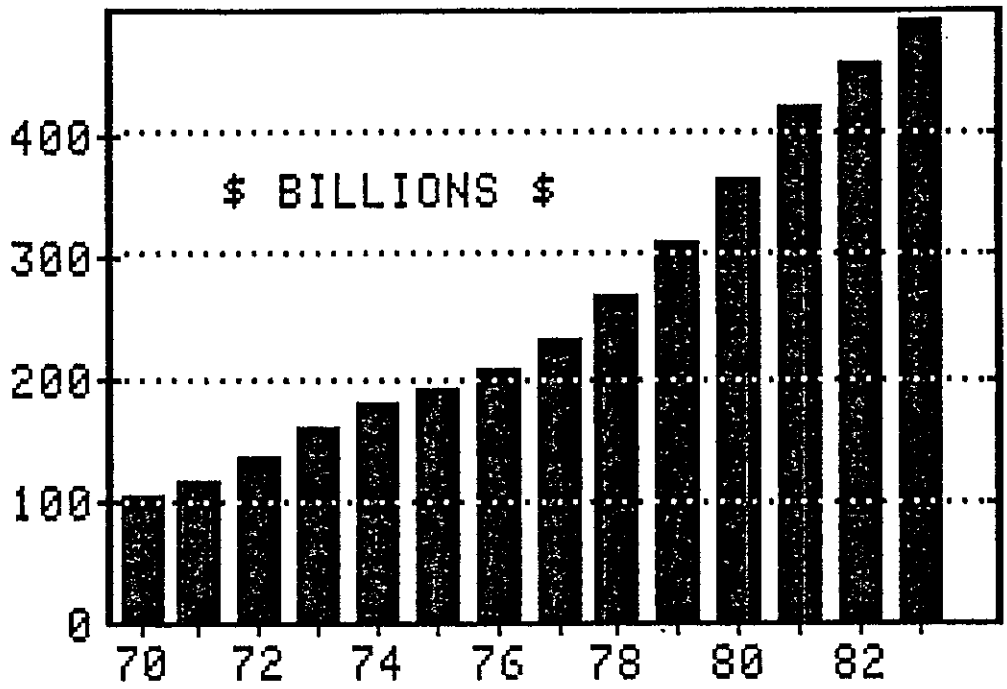
and percents.

Total personal income reached over $495 billion in 1983.[10] Figure 1-5 shows total personal income. There has been a steady increase in personal income since 1970. the 1974-76 and 1981-82 periods shows only a slowing in the rate of growth.



INDUSTRY EMPLOYMENT - March 1982 [8]

FIGURE 1-4 .



TOTAL PERSONAL INCOME [11]
1970 - 1983
FIGURE 1-5 .

TABLE 1-1 GENERAL FLORIDA TRENDS WITH YEAR TO YEAR % CHANGE 1

YEAR	POPULATION (000)S	% CHG	GROSS SALES ($MIL)	% CHG	NON-AGRICULTURAL EMPLOYMENT (000)S	% CHG	PERSONAL INCOME ($MIL)	% CHG
1970	6791		36619		2155		103510	
1971	7179	5.71	41131	12.32	2248	4.31	115738	11.81
1972	7566	5.39	49021	19.18	2513	11.77	133454	15.31
1973	8042	6.29	59278	20.92	2779	10.57	157081	17.70
1974	8453	5.11	65902	11.17	2864	3.06	176150	12.14
1975	8618	1.95	66806	1.37	2557	-10.70	189073	7.34
1976	8744	1.46	73778	10.44	2580	0.88	205972	8.94
1977	8920	2.01	82691	12.08	2803	8.65	231941	12.61
1978	9157	2.66	98150	18.69	3033	8.20	267893	15.50
1979	9448	3.18	116449	18.64	3268	7.74	310863	16.04
1980	9746	3.15	136207	16.97	3449	5.54	363606	16.97
1981	10106	3.69	156504	14.90	3605	4.53	423900	16.58
1982	10375	2.66	161671	3.30	3630	0.70	457632	7.96
1983	10592	2.09	171625	6.16	3778	4.07	495448	8.26

TABLE 1-2 INDUSTRY EMPLOYMENT; BASED ON EMPLOYMENT COVERED BY UNEMPLOYMENT COMPENSATION LAW, MARCH 1982 9

SIC CODE	INDUSTRY	EMPLOYMENT	PERCENT
01-09	AGRICULTURE, FORESTRY, AND FISHING	139084	3.61
10-14	MINING	10267	0.27
15-17	CONSTRUCTION	268607	6.98
20-39	MANUFACTURING	469745	12.21
40-49	TRANSPORTATION, COMMUNICATION, PUB. UTILITIES	252948	6.57
50-51	WHOLESALE TRADE	216132	5.62
52-59	RETAIL TRADE	797596	20.72
60-69	FINANCE, INSURANCE, AND REAL ESTATE	273253	7.10
70-89	SERVICES	1170851	30.42
90-97	GOVERNMENT	249256	6.48
99	NONCLASSIFIABLE ESTABLISHMENTS	901	0.02
	TOTAL EMPLOYMENT	3848640	100.00

Notes to Chapter 1

1. Bureau of Economic and Business Research (BEBR), The BEBR Computerized Data Base , (Gainesville: Northeast Regional Data Center, University of Florida, 1982), Files FNA, GSALESNS, TENAGENS, YF.

2. Frances W. Terhune, ed. 1983, Florida Statistical Abstract (Gainesville: University Presses of Florida, 1983), 477.

3. BEBR, Computerized Data Base, File, FNA.

4. Ibid., File CNN.

5. Ibid., File GSALESNS.

6. Ibid., File TENAGFNS.

7. Ibid.

8. Terhune, Florida Statistical Abstract, 207-209.

9. Ibid.

10. BEBR, Computerized Data Base, File YF.

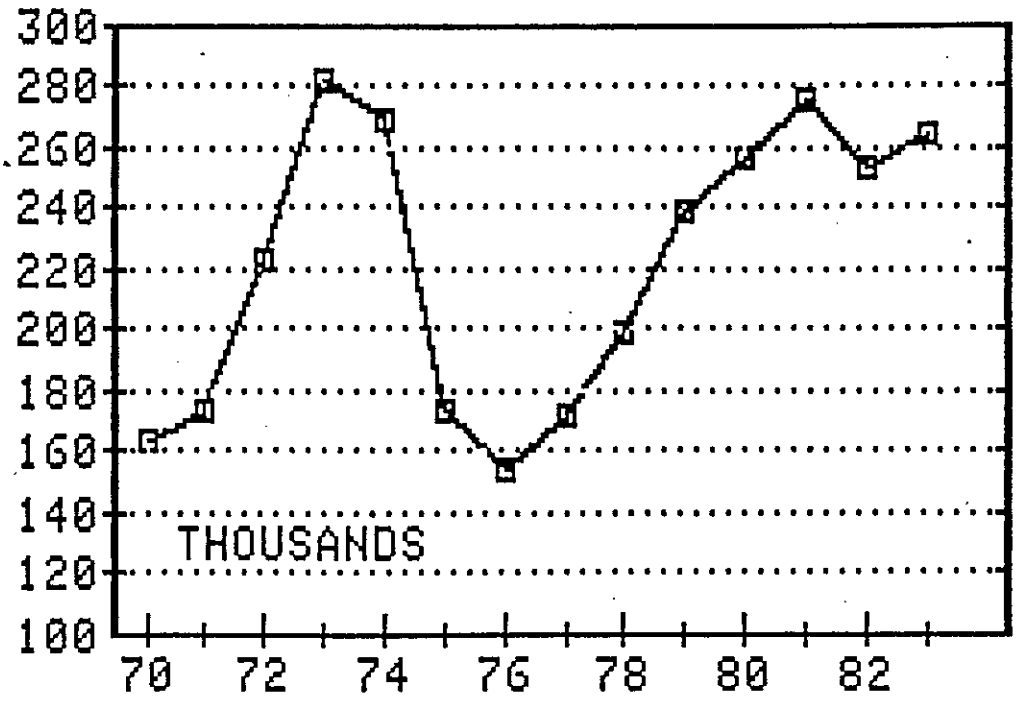
11. Ibid.

CHAPTER 2.

CONSTRUCTION AND THE FLORIDA ECONOMY

I. CONTRACT CONSTRUCTION

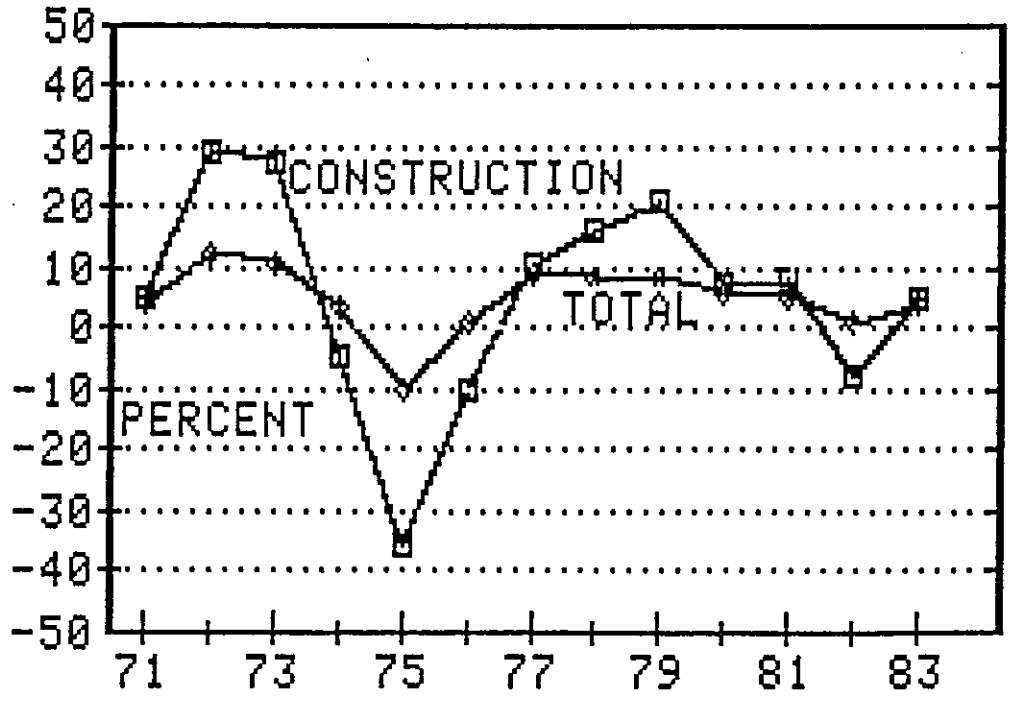
The major industry divisions shown in Table 1-2 comprise the economy of Florida. Among these divisions is one which is wholly construction, 'Contract Construction'. It is the most volatile of the economic divisions. Figure 2-1 shows employment in this division from 1970. It is easy



EMPLOYMENT IN CONSTRUCTION [1]
1970 - 1983
FIGURE 2-1 .

to see from the recession periods, 1974-76 and 1981-82, how economic factors have a magnified effect on the construction industry. Figure 2-2 shows how construction division employment changes compare with total employment changes. Total employment fluctuates in a narrow range of -10 to +12% from the previous year whereas construction employment fluctuates widely from -36% to +29%. The actual figures are shown in Table 2-1.

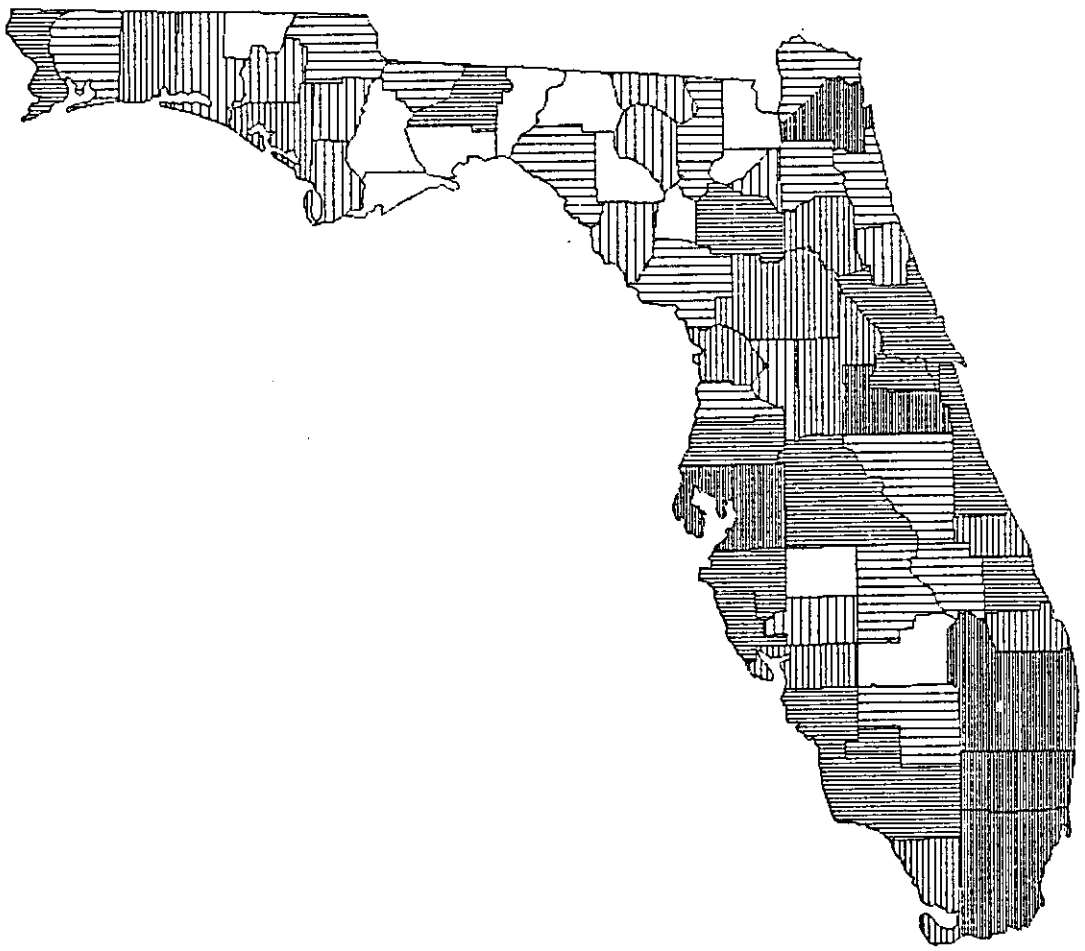
Contract construction employment distribution throughout the State for 1982 is shown by Map 2-1. Dade county led with 37,141 followed by Broward county with



CONSTRUCTION & TOTAL EMPLOYMENT[2]
CHANGE FROM PREVIOUS YEAR
FIGURE 2-2 .

CONTRACT CONSTRUCTION EMPLOYMENT

1982 [4]



EMPLOYEES

- LESS THAN 75
- 75 TO 249
- 250 TO 999
- 1,000 TO 2,999
- 3,000 TO 14,999
- 15,000 AND UP

MAP 2-1

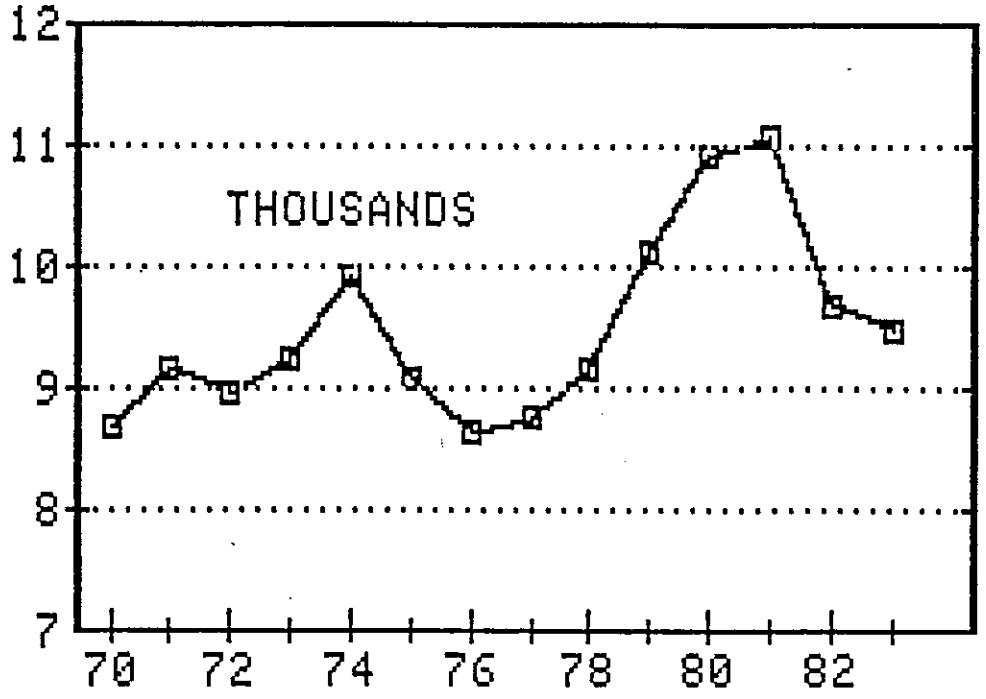
25,526. Next came Palm Beach (19,537), Hillsborough (19,363), Orange (18,782), and Pinellas (17,827).[5]

II. CONSTRUCTION ASPECTS OF OTHER INDUSTRY DIVISIONS

MINING & MANUFACTURING

Florida ranks 4th in the United States in non-fuel mineral production, following Arizona, Minnesota, and California. In 1981 Florida production accounted for 6.85% of total U.S. production.[6]

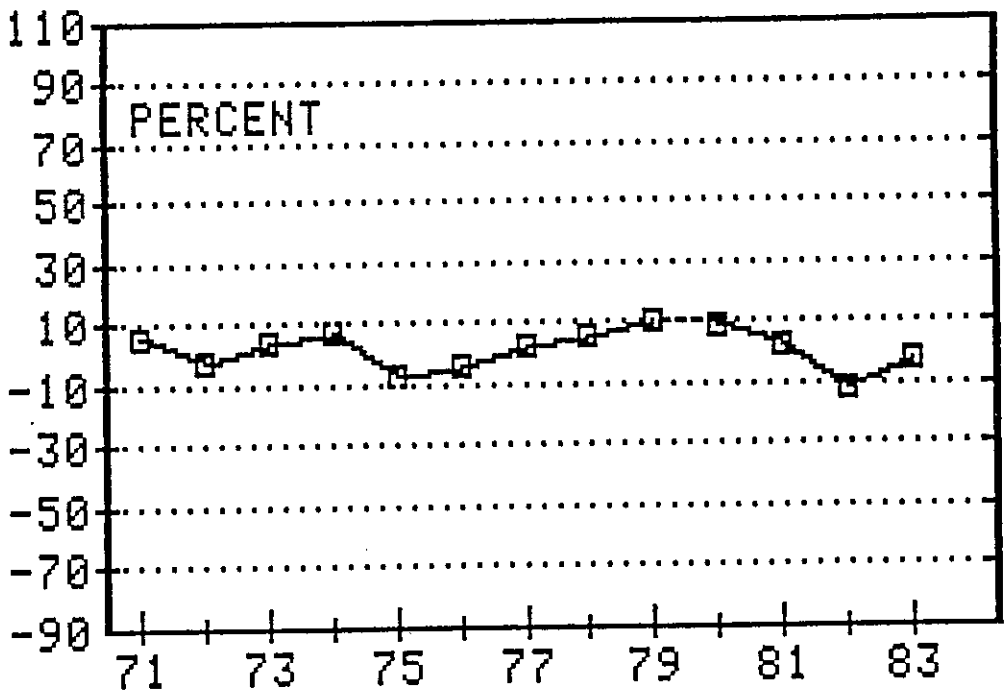
A very large portion of mining in Florida is



EMPLOYMENT IN MINING[7]
1970 - 1983
FIGURE 2-3 .

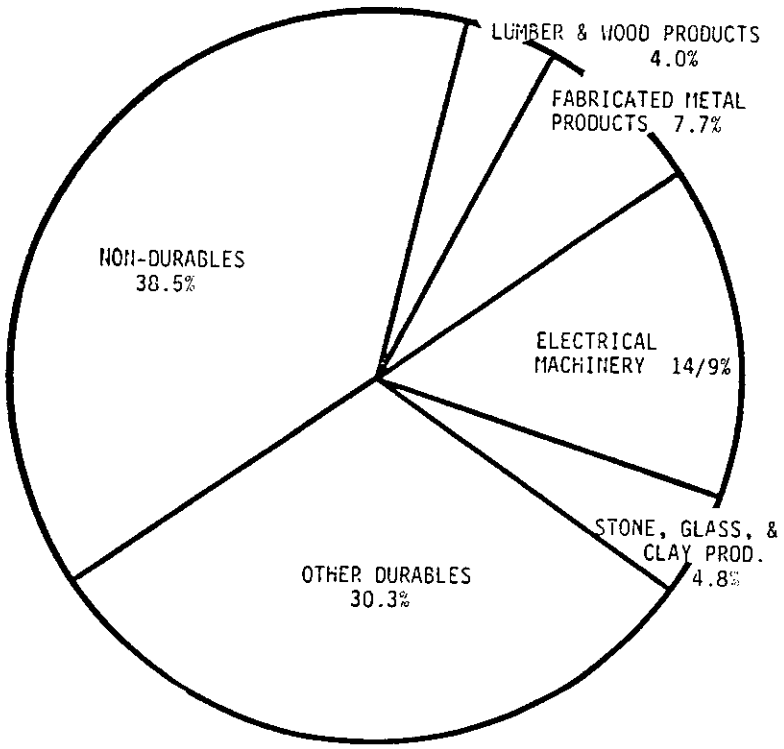
construction related. Tables 2-2 and 2-3 show employment in mining and value of construction related mineral production. From these tables it seems that approximately 30% of mining is construction related.

Figure 2-3 shows the trend in mining employment since 1970. The matching tabular numbers are in Table 2-1. Employment has fluctuated between 8,630 and 11,070. Figure 2-4 is the yearly percent change graph for mining employment. A comparison of this with the construction line in Figure 2-2 will show mining employment to be much more stable.



EMPLOYMENT IN MINING
CHANGE FROM PREVIOUS YEAR[10]
FIGURE 2-4 .

Manufacturing is commonly divided into durable goods and non-durable goods manufacturing. Many of the durable goods are construction related. Table 2-4 shows a breakout of construction related employment from the complete manufacturing industry list for March 1982. This results in a conservative estimate that 11.8% of employment in manufacturing is construction related. Figure 2-5 is based

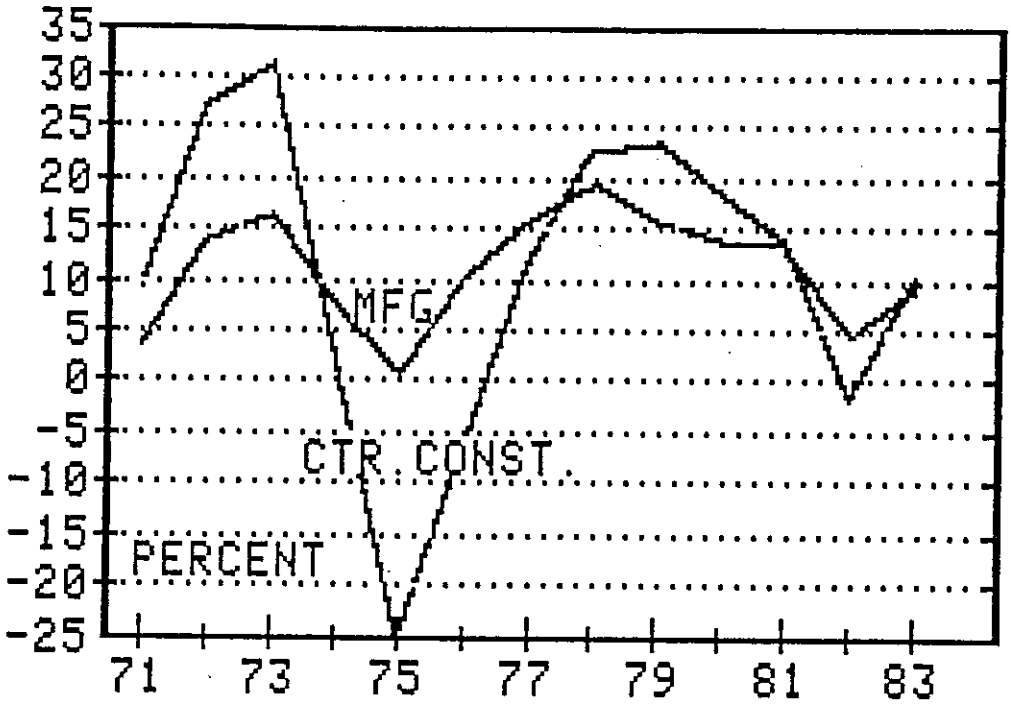


MANUFACTURING WAGE/SALARY DISBURSEMENTS - 1981 [12]

FIGURE 2-5.

on data from the State Data Base (Table 2-5) and separates manufacturing into several main construction related areas based on wage and salary disbursements.[12] A comparison of

the yearly percent change in employment for contract



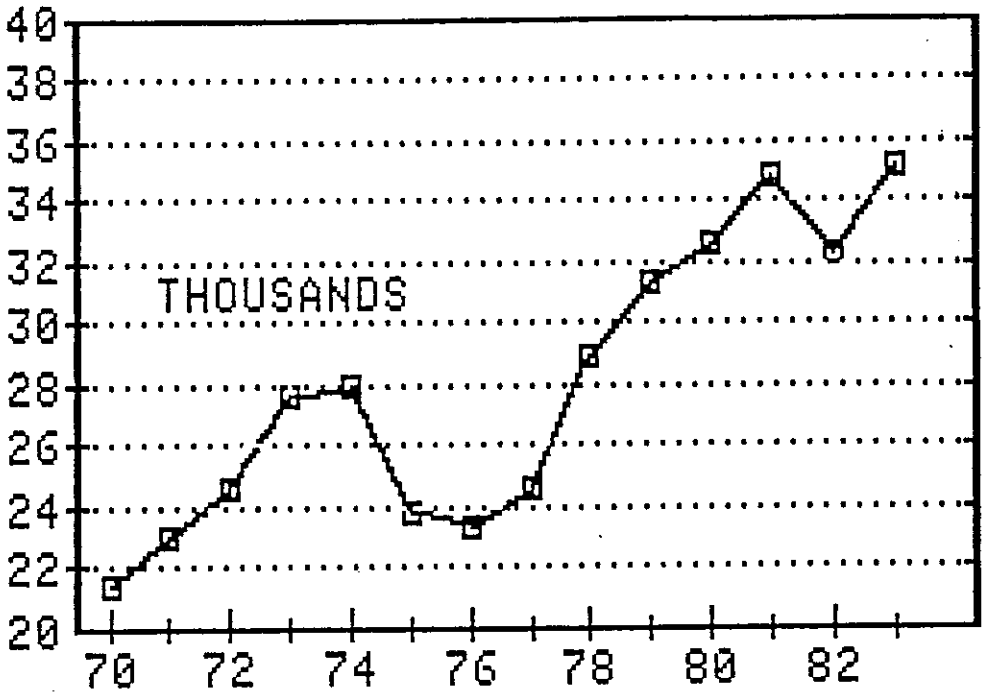
MANUFACTURING & CONTRACT CONST.[14]
YEARLY % CHANGE IN EARNINGS
FIGURE 2-6 .

construction and manufacturing in Figure 2-6 shows employment to be more stable in manufacturing than in construction.

WHOLESALE & RETAIL TRADE

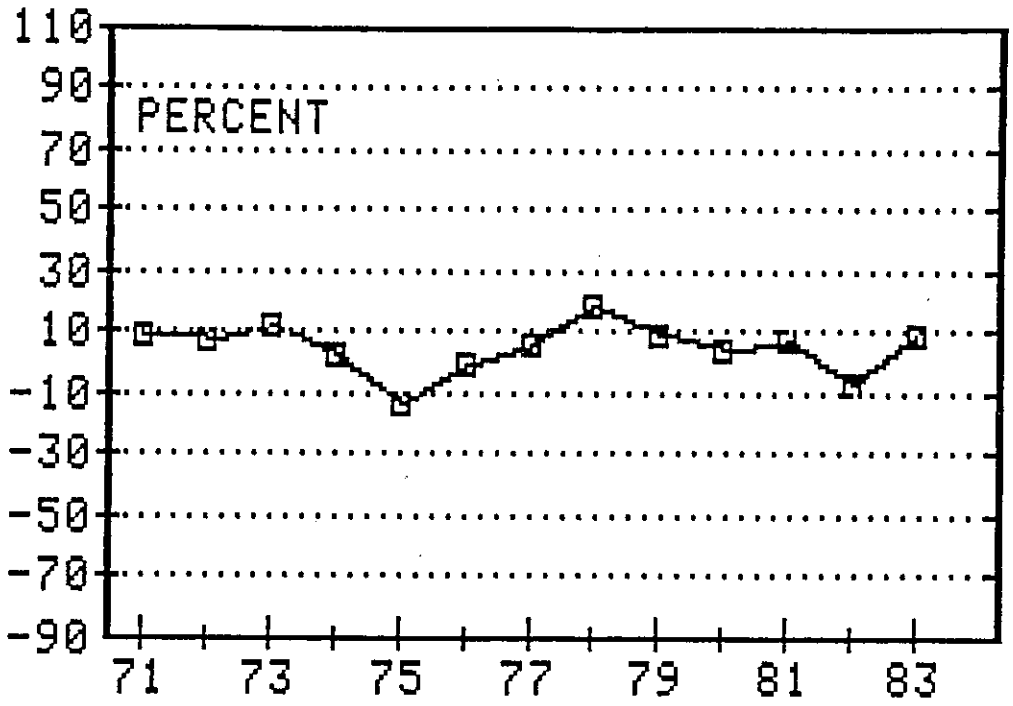
Table 2-6 gives a breakout of construction related wholesale and retail trade. Items 506, 507, and 508 were estimated at the percentages given to the right. The resulting 4.9% of wholesale and retail trade employment that is construction related may be conservative.

Figure 2-7 graphs the building materials employment figures from Table 2-1. Note again the 1974-76 and 1981-82



EMPLOYMENT IN BUILDING MATERIALS [16]
1970 - 1983
FIGURE 2-7 .

recessions. Comparing Figure 2-8 with the construction line in Figure 2-6 will show employment in building materials more stable than employment in construction.



EMPLOYMENT IN BUILDING MATERIALS[17]
CHANGE FROM PREVIOUS YEAR
FIGURE 2-8 .

FINANCE, INSURANCE & REAL ESTATE

This report does not make a detailed breakout of construction related areas of this industry division. The following, however, should be considered. Nearly all new residential construction is financed by mortgages. Nearly all new commercial construction is financed by mortgages. Construction firms take advantage of commercial borrowing as much as other commercial ventures.

Nearly all new construction is insured during construction with builders risk insurance and upon

completion with hazard insurance. All construction firms with more than three employees are required by law to have worker compensation coverage. State licensing law requires employer's liability insurance coverage. Construction firms, like any other businesses, carry their share of automotive liability, key man life insurance, theft, and other insurances.

Much new residential construction is sold by real estate firms. After construction, many commercial buildings are leased, managed, and resold through real estate firms. Most single family residential construction is resold through real estate firms. The national average for turnover in home ownership is approximately 20% per year.[18] This means that on average a home will be sold every five years. If the average economic life of a home is taken as 35 years, then, on average, it will be sold as a used home six times (most likely by a real estate firm).

Real estate investors typically evaluate residential income property as approximately 20% land and 80% improvements.[19] The 80% is nearly all construction. This generally holds true for all improved real estate. The majority of the value is in the improvements, the construction.

SERVICES

The construction related area of this section is the business services area. In addition to the general business services which construction firms use as well as other businesses, the construction industry makes particular use of the services of engineers, architects, & surveyors. Table 2-7 shows a county breakdown of this business service sector. Note that Brevard county shows a disproportionate share. The high concentration of engineers working for N.A.S.A. and for related high technology firms like Harris Corporation may account for this variation.

AGRICULTURE, FORESTRY, & FISHERIES

Agriculture consists of crop and livestock production and related agricultural services. Although some construction materials are made from by-products of the agriculture industry, such as fiberboard from sugar cane, that would be considered as part of the manufacturing subsector, 'Food and kindred products', and not part of agriculture.

Fisheries also have little direct relationship with the construction industry.

Florida ranks 3rd in acreage of tree farms following Georgia and Alabama, and slightly leading 4th place Oregon. As of January, 1983, Florida had 6,244,488 acres of tree farms, 7.3% of the U.S. total.[21]

Forest products are mainly pulpwood and saw/veneer logs of both hardwoods and softwoods. The majority of saw/veneer logs are used to make structural timbers, dimension lumber, boards, plywood, paneling, and other wood products directly linked with the construction industry. Pulpwood products include construction related items such as particleboard, masonite, and pressboard products.

Hardwood production is concentrated in Dixie and Levy counties. These two counties account for 30.8% of hardwood production for the State, with a total of 11,865,000 cubic feet produced in 1981.[22]

Softwood production leaders are Taylor (18,257,000 cf), Levy (16,665,000 cf), Nassau (16,647,000 cf), and Bay (16,155,000 cf) counties. Total softwood production for 1981 was 378,128,000 cubic feet. [23]

According to Unemployment Compensation figures for March 1982, there were 1,692 people employed in the forestry industry in Florida.

GOVERNMENT

Government, as an industry division, consists of the following subsectors:

91 Executive, legislative, & general government, except finance
92 Justice, public order, and safety
93 Public finance, taxation, and monetary policy
94 Administration of human resources programs
95 Administration of environmental quality and housing programs

96 Administration of economic programs
97 National security and international affairs

Certainly, construction is affected by taxation, monetary policy, and environmental programs; but it is zoning and codes enforcement, building inspection and permitting departments, planning and review committees, and housing programs that are more directly construction related.

III. CONSTRUCTION'S CONTRIBUTION TO TAX REVENUES

The State and local taxes that most affect construction, mining, and prefabricated wood products including mobile homes are: [24]

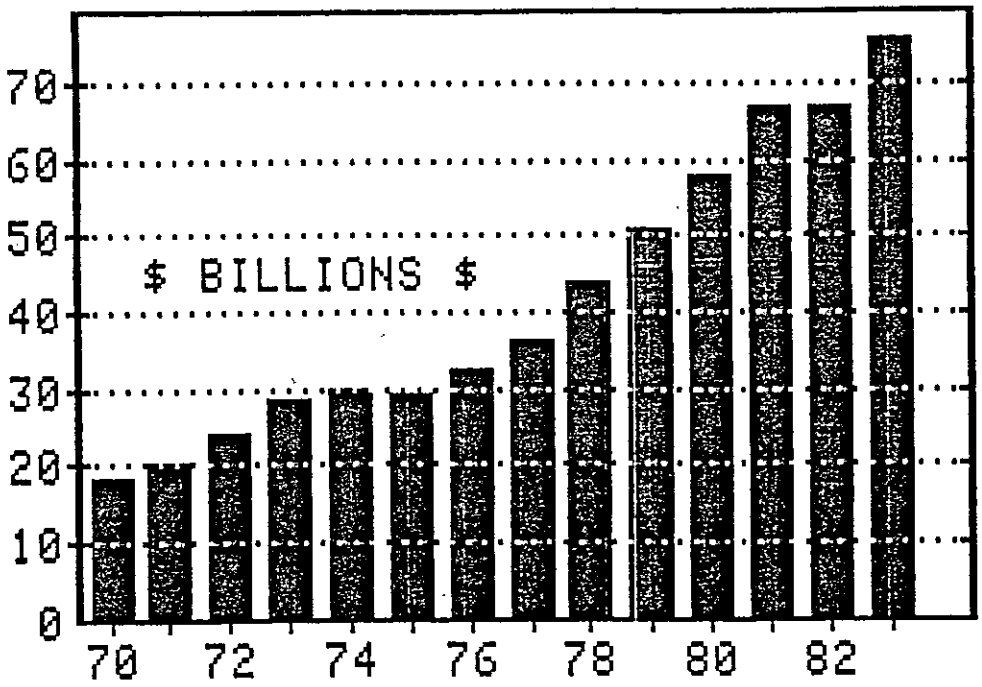
1. Corporate income tax - 5% income
2. Documentary stamp taxes - $.15/$100 on promissory notes,mortgages,trust deeds,security agreements
3. Mobile home licenses - $20 to $80/yr in 8 length classifications
4. Occupational licenses - local governing authority
5. Severance tax on solid minerals - 5% of value at the point of severance
6. Unemployment compensation tax - up to 4.5% of first $7,000 wages per employee
7. Sales and use tax - 5%

The sales and use tax is by far the largest single contributor to total State taxes. For fiscal 1981-82 sales and use tax receipts were $2,805,739,000 which was 47.4% of total State tax receipts. [25]

Table 2-8 contains calendar year totals for taxable

sales; State sales tax revenue; and sales tax revenue from lumber, builders, and contractors.

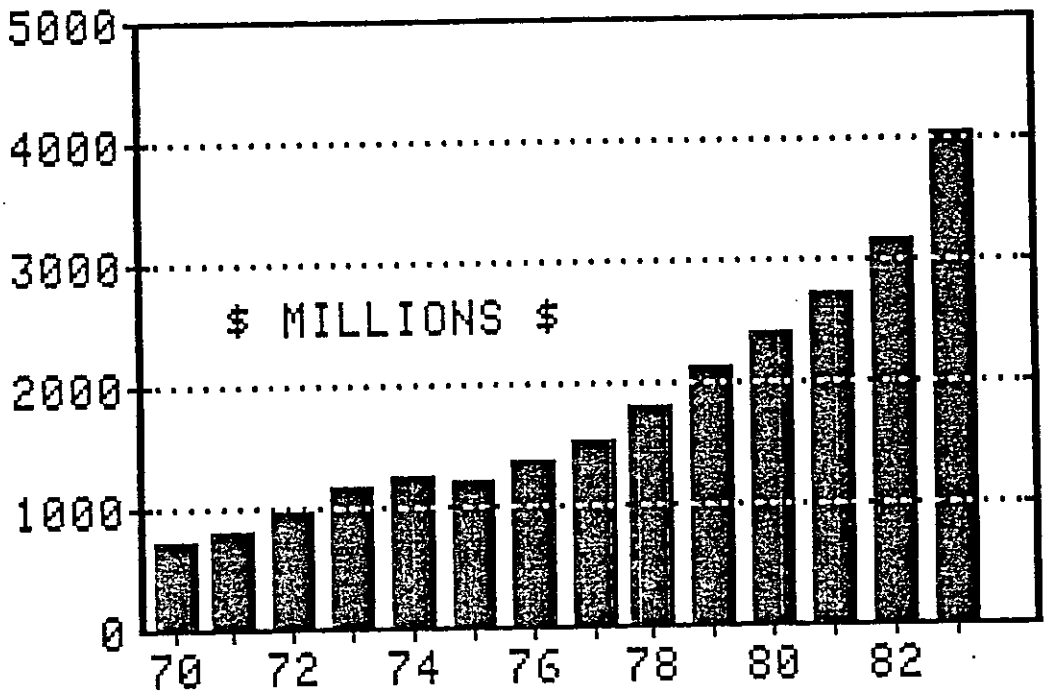
The trend in taxable sales is shown in Figure 2-9.



TAXABLE SALES [27]
1970 - 1983
FIGURE 2-9

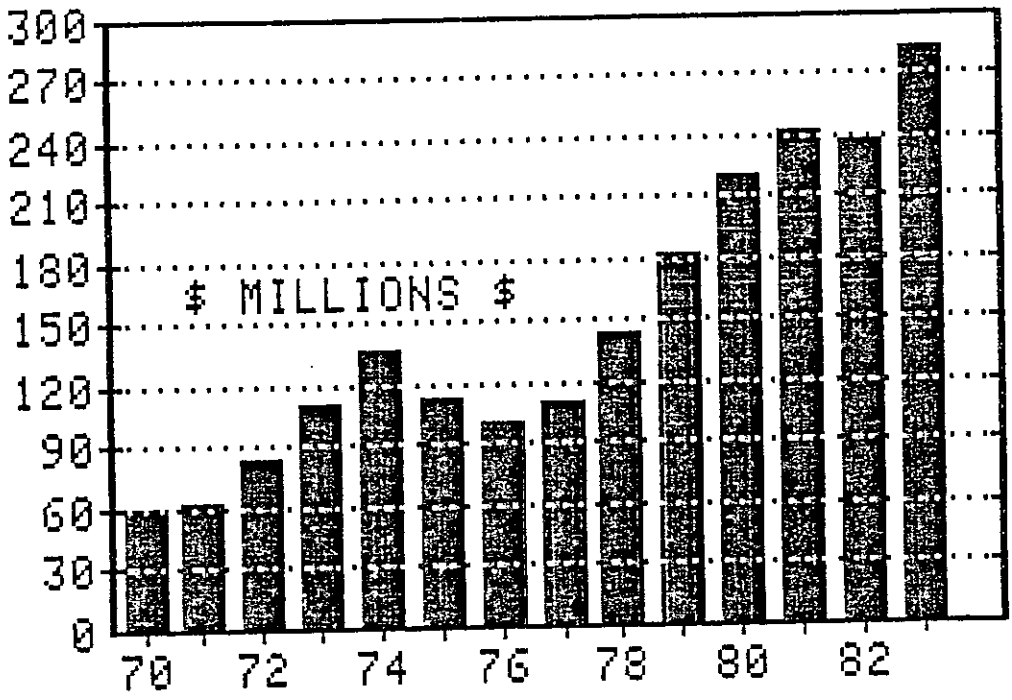
Note the recession years of 1974-76 and 1981-82. Figure 2-10 shows the trend in State sales and use tax revenue. The 1974-76 pattern reflects the pattern in taxable sales, but the 1981-82 pattern does not. The State sales tax was increased to 5% from 4% effective May 1, 1982. Therefore, for eight months of 1982 the State was collecting sales taxes at a rate 25% higher than before. Figure 2-11 is a graph of the yearly percent change in sales and use tax revenue.

During periods of tight credit and resulting higher interest rates, State and local governments have had difficulty securing financing. They share this characteristic with private sector construction borrowers. Most construction requires long-term capital borrowing just like that required by governments. As we have seen in Figures 2-1 and 2-2 the construction industry is highly volatile. In the next chapter we will see which subsectors of the construction are the most volatile of all. Because of this sensitivity to the credit cycle, any reliance on the construction industry in times of recession and high



STATE SALES & USE TAX REVENUE [28]
1970 - 1983
FIGURE 2-10 .

interest rates for State revenues may result in a greater need for long term State borrowing just when rates are at their highest.



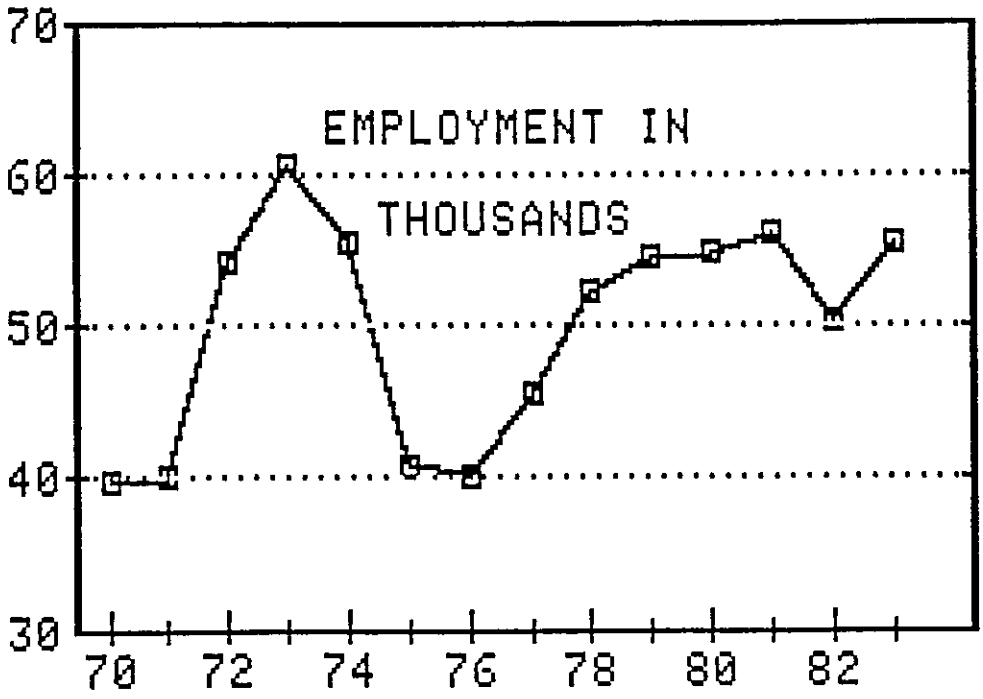
SALES TAX REVENUE FROM LUMBER, BUILDERS, CONTRACTORS 1970-1981[29]
FIGURE 2-11 .

Sales tax revenue from lumber, builders, and contractors is listed in Table 2-6 and shown in Figure 2-11. While total sales and use tax increased slightly from 1974 to 1976, the revenue from lumber, builders, and contractors decreased from $136 million in 1974 to $100 million in 1976. There was also a slight decrease from this construction sector from 1981 to 1982. In 1974 sales tax revenues from lumber, builders, and contractors was 11.1% of State sales

and use tax revenues. By 1983 this had dropped to 7.0%.

IV. CONSTRUCTION RELATED INDUSTRY EMPLOYMENT

In the previous sections of this chapter the relationship of the construction industry to other industry divisions of the Florida economy have been pointed out. Several industry divisions have been analyzed for construction related areas. The Florida Department of Labor



CONSTRUCTION RELATED INDUSTRIES [30]
1970 - 1983
FIGURE 2-12 .

and Employment Security has aggregated employment in construction related industries and the results are shown in Table 2-1 and Figure 2-12. The drop in employment from 1973-76 is dramatic. Note also the drop in employment from 1981 to 1982. The year to year percent change in employment in construction related industries is shown in Figure 2-13. Comparison of this figure with the construction line in Figure 2-2 will show that construction itself is still more volatile.

TABLE 2-1 CONSTRUCTION AND RELATED EMPLOYMENT FOUR QUARTER AVERAGE; WITH YEAR TO YEAR % CHANGE 3

YEAR	CONSTRUCTION (000)S	% CHG	MINING (000)S	% CHG	BUILDING MATERIALS (000)S	% CHG	CONSTRUCTION RELATED INDUSTRIES (000)S	% CHG
1970	163.73		8.64		21.34		39.63	
1971	172.05	5.08	9.16	5.96	22.98	7.68	39.99	0.91
1972	222.00	29.03	8.93	-2.54	24.63	7.15	54.20	35.53
1973	282.10	27.07	9.23	3.36	27.55	11.88	60.45	11.53
1974	268.05	-4.98	9.90	7.32	27.90	1.27	55.43	-8.31
1975	172.18	-35.76	9.07	-8.33	23.81	-14.65	40.84	-26.32
1976	153.95	-10.59	8.63	-4.95	23.34	-1.97	40.10	-1.81
1977	170.53	10.77	8.76	1.52	24.61	5.44	45.55	13.59
1978	198.34	16.31	9.15	4.43	28.90	17.39	52.19	14.59
1979	238.92	20.46	10.12	10.65	31.30	8.31	54.40	4.23
1980	255.73	7.03	10.89	7.66	32.57	4.07	54.82	0.77
1981	275.35	7.67	11.07	1.60	34.84	6.96	56.07	2.28
1982	252.95	-8.14	9.68	-12.59	32.31	-7.26	50.48	-9.98
1983	264.28	4.48	9.47	-2.18	35.17	8.86	55.33	9.61

TABLE 2-2 CONSTRUCTION RELATED MINING; BASED ON EMPLOYMENT COVERED BY UNEMPLOYMENT COMPENSATION LAW, MARCH 1982 8

SIC* CODE	INDUSTRY	CONST. RELATED	OTHER
10	METAL MINING & SERVICES		280
12,13	COAL, OIL & GAS EXTRACTION		880
			10
141	DIMENSION STONE	48	
142	CRUSHED & BROKEN STONE INC. RIPRAP	1994	
144	SAND AND GRAVEL	851	
145	CLAY, CERAMIC, & REFACTORY MINERALS	380	
147,149	CHEMICAL, FERTILIZER &MISC MINERALS		5814
148	NONMETAL, NONFUEL SERVICES		10
	TOTALS	3273	6994

TOTAL EMPLOYMENT IN MINING 10267

ERROR PERCENT OF EMPLOYMENT IN MINING IS CONSTRUCTION RELATED.

*STANDARD INDUSTRIAL CLASSIFICATION DEVELOPED BY U.S. OFFICE OF MANAGEMENT AND BUDGET

TABLE 2-3 VALUE OF CONSTRUCTION RELATED MINERAL PRODUCTION, 1980 & 1981; IN THOUSANDS OF DOLLARS [9]

MINERAL	1980 CON REL	1980 OTHER	1981 CON REL	1981 OTHER
MASONRY CEMENT	22074		20757	
PORTLAND CEMENT	182590		199064	
CLAYS	24164		35319	
GEMSTONES		5		6
LIME (75% CON REL)	9326	3108	8507	2836
PEAT		2398		2885
SAND AND GRAVEL	28766		32719	
CRUSHED STONE	215972		226192	
COMB. VAL. OF KAOLIN, MAGNESIUM, PHOSPHATE, RARE-EARTH, INDUSTRIAL SAND & GRAVEL, STAUROLITE, TITANIUM, ZIRCON CONCENT.		1020855		1197304
TOTALS	482892	1026366	522558	1203031

32 PERCENT OF 1980 NONFUEL MINERAL VALUE IS CONSTRUCTION RELATED

30 PERCENT FOR THE YEAR 1981

TABLE 2-4 CONSTRUCTION RELATED MANUFACTURING BASED ON EMPLOYMENT COVERED BY UNEMPLOYMENT COMPENSATION LAW, MARCH, 1982 [11]

SIC CODE	INDUSTRY	EMPLOYEES CON.REL	EMPLOYEES MFG.ONLY
20	FOOD AND KINDRED PRODUCTS		52243
21	TOBACCO MANUFACTURERS		2038
22	TEXTILE MILL PRODUCTS		2315
23	APPAREL AND OTHER FINISHED PRODUCTS MADE FROM FABRICS & SIM.MAT		33511
24X	OTHER WOOD PRODUCTS EXCPT FURNITURE		8631
243	MILLWORK, VENEER, PLYWD,&STRUCTURAL WOOD MEMBERS	8511	
245	WOOD BUILDINGS & MOBILE HOMES	3677	
25	FURNITURE AND FIXTURES		10823
26	PAPER AND ALLIED PRODUCTS		16659
27	PRINTING, PUBLISHING, & ALLIED IND.		46263
28	CHEMICALS AND ALLIED PRODUCTS		26790
29X	PETROLEUM REFINING & OTHER PRODUCTS		287
295	PAVING AND ROOFING MATERIALS	1482	
30	RUBBER AND MISC. PLASTICS PRODUCTS		16759
31	LEATHER AND LEATHER PRODUCTS		3675
32X	OTHER GLASS AND CLAY PRODUCTS		4893
325	STRUCTURAL CLAY PRODUCTS	728	
327	CONCRETE, GYPSUM, &PLASTER PRODUCTS	14499	
328	CUT STONE AND STONE PRODUCTS	137	
33	PRIMARY METAL INDUSTRIES		4866
34X	OTHER FABRICATED METAL PRODUCTS, EXCEPT MACHINERY &TRANS EQ.		12536
343	HEATING EQ.(NON ELEC) & PLUMBING FIXTURES	278	
344	FAB. STRUCTURAL METAL PRODUCTS	20944	
35X	OTHER MACHINERY, EXCEPT ELECTRICAL		36427
353	CONST.,MINING, MATERIALS HANDLING MACHINERY AND EQUIPMENT	2112	
36X	OTHER ELECTRICAL & ELECTRONIC MACHINERY, EQ., & SUPPLIES		62924
364	ELECTRIC LIGHTING AND WIRING EQUIP.	3051	
37	TRANSPORTATION EQUIPMENT		51480
38	MEASURING, ANALYZING & CONTROLLING INSTRUMENTS; PHOTO, MED., OPTICAL, WATCHES & CLOCKS		12944
39	MISC. MANUFACTURING INDUSTRIES		8262
	TOTALS	55419	414326
	TOTAL EMPLOYMENT		469745
	CONSTRUCTION MATERIALS & EQUIPMENT =	11.80 PERCENT OF EMPLOYEES	

TABLE 2-5 MANUFACTURING WAGE/SALARY DISBURSEMENTS 1981 IN $THOUSANDS

CLASSIFICATION	$$	PERCENT
LUMBER & WOOD PROD (X FURN)	302335	3.96
FAB. METAL PRODUCTS	578744	7.57
ELEC. MACHINERY	1137423	14.88
STONE, GLASS, CLAY PRODUCTS	367682	4.81
OTHER DURABLES	2312975	30.27
NON-DURABLE GOODS	2942644	38.51

TABLE 2-6 CONSTRUCTION RELATED WHOLESALE & RETAIL TRADE; EMPLOYMENT COVERED BY UNEMPLOYMENT COMPENSATION LAW, MARCH 1982 [15]

SIC CODE	INDUSTRY	CONST. RELATED	WHSL/RTL TRADE ONLY
	WHOLESALE TRADE		
50X	DURABLE GOODS OTHER THAN BELOW		109440
503	LUMBER & OTHER CONSTRUCTION MTLS.	9977	
506	ELECTRICAL GOODS (10%OF)	1979	
507	HARDWARE, PLBG & HTG.EQ.(25%OF)	2942	
508	MACHINERY, EQ., &SUPPLIES (10%OF)	5227	
51	NONDURABLE GOODS		86567
	RETAIL TRADE		
521	LUMBER & OTHER CONSTRUCTION MTLS.	17807	
523	PAINT, GLASS, & WALLPAPER STORES	3376	
525	HARDWARE STORES	5867	
526	RETAIL NURSERIES & GARDEN STORES		3517
527	MOBILE HOME DEALERS	2132	
53	GENERAL MERCHANDISE STORES		113129
54	FOOD STORES		135807
55	AUTOMOTIVE DEALERS & GAS STATIONS		85348
56	APPAREL & ACCESSORIES STORES		45329
57	FURNITURE, HOME FURNISHINGS, & EQ.		35629
58	EATING & DRINKING PLACES		260741
59	MISCELLANEOUS RETAIL		88914
	TOTALS	49307	964421
	TOTAL EMPLOYMENT IN WHOLESALE/RETAIL		1013728

4.86 % OF TOTAL EMPLOYMENT IS CONSTRUCTION RELATED

TABLE 2-7 COUNTY CONSTRUCTION RELATED EMPLOYMENT FOR SELECTED INDUSTRY DIVISIONS; BASED ON EMPLOYMENT COVERED BY UNEMPLOYMENT COMPENSATION LAW, MARCH 1982 20

COUNTY	CONST. RELATED MANUF.	PCT OF TOTAL	CONST. RELATED WHSL/RTL TRADE	PCT OF TOTAL	ENGINEER ARCHITECT SURVEYOR SERVICES	PCT OF TOTAL
ALACHUA	491	0.89	659	1.25	837	2.48
BAKER	54	0.10	17	0.03	0	0.00
BAY	583	1.05	476	0.91	164	0.49
BRADFORD	59	0.11	40	0.08	10	0.03
BREVARD	1220	2.20	1079	2.06	7535	22.31
BROWARD	4909	8.86	5348	10.19	2181	6.46
CALHOUN	100	0.18	20	0.04	10	0.03
CHARLOTTE	113	0.20	173	0.33	48	0.14
CITRUS	122	0.22	126	0.24	252	0.75
CLAY	155	0.28	264	0.50	80	0.24
COLLIER	340	0.61	435	0.83	359	1.06
COLUMBIA	452	0.82	145	0.28	56	0.17
DADE	9269	16.72	11087	21.13	4479	13.26
DE SOTO	16	0.03	54	0.10	10	0.03
DIXIE	263	0.48	12	0.02	10	0.03
DUVAL	3610	6.51	3889	7.41	2489	7.37
ESCAMBIA	1613	2.91	1081	2.06	361	1.07
FLAGLER	141	0.25	30	0.06	10	0.03
FRANKLIN	12	0.02	25	0.05	0	0.00
GADSDEN	481	0.87	80	0.15	60	0.18
GILCHRIST	11	0.02	11	0.02	10	0.03
GLADES	6	0.01	5	0.01	10	0.03
GULF	25	0.05	15	0.03	60	0.18
HAMILTON	45	0.08	15	0.03	0	0.00
HARDEE	77	0.14	45	0.09	0	0.00
HENDRY	8	0.01	51	0.10	84	0.25
HERNANDO	259	0.47	116	0.22	80	0.24
HIGHLANDS	129	0.23	146	0.28	31	0.09
HILLSBORGH	5374	9.70	4837	9.22	1684	4.99
HOLMES	93	0.17	21	0.04	60	0.18
INDIAN RVR	165	0.30	235	0.45	138	0.41
JACKSON	189	0.34	153	0.29	6	0.02
JEFFERSON	51	0.09	21	0.04	10	0.03
LAFAYETTE	6	0.01	4	0.01	10	0.03
LAKE	828	1.49	372	0.71	67	0.20
LEE	1036	1.87	1059	2.02	528	1.56
LEON	480	0.87	759	1.45	393	1.16
LEVY	350	0.63	37	0.07	40	0.12
LIBERTY	209	0.38	3	0.01	0	0.00
MADISON	183	0.33	31	0.06	10	0.03
MANATEE	1374	2.48	602	1.15	161	0.48
MARION	1165	2.10	617	1.18	181	0.54
MARTIN	161	0.29	254	0.48	143	0.42
MONROE	68	0.12	298	0.57	106	0.31
NASSAU	104	0.19	74	0.14	38	0.11
OKALOOSA	385	0.69	393	0.75	1432	4.24
OKEECHOBEE	37	0.07	63	0.12	28	0.08
ORANGE	2175	3.92	3394	6.47	2270	6.72
OSCEOLA	208	0.38	226	0.43	34	0.10
PALM BEACH	2418	4.36	2830	5.39	1934	5.73
PASCO	378	0.68	493	0.94	119	0.35
PINELLAS	4703	8.49	3278	6.25	1822	5.39
POLK	2639	4.76	1510	2.88	825	2.44
PUTNAM	550	0.99	114	0.22	71	0.21
ST.JOHNS	87	0.16	200	0.38	46	0.14
ST.LUCIE	272	0.49	357	0.68	300	0.89
SANTA ROSA	52	0.09	108	0.21	35	0.10
SARASOTA	1109	2.00	1081	2.06	487	1.44
SEMINOLE	1261	2.27	776	1.48	147	0.44
SUMTER	175	0.32	55	0.10	10	0.03
SUWANNEE	92	0.17	65	0.12	11	0.03
TAYLOR	412	0.74	50	0.10	10	0.03
UNION	110	0.20	8	0.01	0	0.00
VOLUSIA	1426	2.57	1043	1.99	389	1.15
WAKULLA	37	0.07	16	0.03	10	0.03
WALTON	45	0.08	36	0.07	0	0.00
WASHINGTON	48	0.09	24	0.05	10	0.03
STATEWIDE	396	0.71	1540	2.94	982	2.91
TOTALS	55419	100.00	52482	100.00	33773	100.00

NOTE: SOME COUNTY FIGURES WERE ESTIMATED FROM DATA FOUND IN THE FLORIDA STATISTICAL ABSTRACT 1983

TABLE 2-8 CONSTRUCTION SHARE OF THE SALES TAX, CALENDAR YEAR TOTAL; WITH YEAR TO YEAR % CHANGE

26

YEAR	INDUSTRY TAXABLE SALES ($MIL)	% CHG	STATE SALES/USE TAX REVENUE ($MIL)	% CHG	SALES TAX FROM LUMBER,BUILDERS &CONTRACTORS ($MIL)	% CHG	PERCENT SHARE OF LUM.BLDG,& CONTRACTORS (PCT)	% CHG
1970	18332	12.95	682	21023.00	59	10267.00	8.64	31
1971	20359	11.06	785	15.08	62	5.09	7.89	-8.67
1972	23886	17.32	947	20.70	83	34.41	8.78	11.36
1973	28467	19.18	1137	20.04	110	32.33	9.68	10.24
1974	29751	4.51	1216	6.97	136	23.07	11.14	15.05
1975	29403	-1.17	1197	-1.57	111	-17.93	9.29	-16.62
1976	32244	9.66	1323	10.54	100	-10.34	7.53	-18.89
1977	36233	12.37	1500	13.37	110	9.83	7.30	-3.12
1978	43634	20.43	1794	19.57	142	29.95	7.93	8.69
1979	50776	16.37	2091	16.56	180	26.77	8.63	8.76
1980	58154	14.53	2385	14.10	219	21.56	9.19	6.54
1981	66716	14.72	2692	12.85	241	9.90	8.95	-2.62
1982	66627	-0.13	3135	16.46	236	-2.12	7.52	-15.95
1983	75754	13.70	4035	28.72	282	19.71	7.00	-7.00

Notes to Chapter 2

1. Bureau of Economic and Business Research, The BEBR Computerized Data Base (Gainesville: Northeast Regional Data Center, University of Florida, 1982), File ECFNS.

2. BEBR, Computerized Data Base , Files TENAGENS and ECFNS.

3. Ibid.

4. The Florida Chamber, Economic Profile of Florida Counties (Tallahassee: Florida Chamber of Commerce, 1983), 2.

5. Ibid.

6. Frances W. Terhune, ed., 1983 Florida Statistical Abstract (Gainesville: University Presses of Florida, 1983), 310.

7. BEBR, Computerized Data Base , File EMIFNS.

8. Terhune, Florida Statistical Abstract , 309.

9. Ibid, 310.

10. BEBR, Computerized Data Base , File EMIFNS.

11. Terhune, Florida Statistical Abstract , 309.

12. Florida Division of Economic Development, State Data Base Computer Files , (Tallahassee: Florida State University, 1983), Data Type 4701.

13. Ibid.

14. BEBR, Computerized Data Base , Files CEF and MEF.

15. Terhune, Florida Statistical Abstract , 435-436.

16. BEBR, Computerized Data Base , Files TENAGENS and ECFNS.

17. Ibid, File BLDMAT.

18. Author's personal data.

19. Ibid.

20. Terhune, Florida Statistical Abstract , 349,437-438,474. Note: Where actual figures were not available, estimates were made by the present authors.

21. Terhune, Florida Statistical Abstract , 307.

22. Ibid., 301-302.

23. Ibid.

24. Florida Department of Revenue, Guidebook to Florida Taxes and Licensing Requirements, (Tallahassee: Florida Department of Revenue, 1984), 13, 17, 18, 31-36, 39, 40.

25. Terhune, Florida Statistical Abstract, 574.

26. BEBR, Computerized Data Base, Files TSALESNS, TX-SNSA, TXS6.

27. Ibid, File TSALESNS.

28. Ibid, File TX-SNSA.

29. Ibid, File TXS6.

30. Ibid, File CONREL.

CHAPTER 3.

CONSTRUCTION SUBSECTORS, MINING, AND MOBILE HOMES

I. GENERAL CLASSIFICATIONS, DEFINITIONS, AND U.S. DATA

CATEGORIES & GROUPING

The format for 'New Construction Put in Place', a census grouping, is broken down as follows: [1]

1. Private construction
    - A. Residential bldgs.(including farmhouses)
        - 1) New housing
            - a. 1 unit housing
            - b. 2+ unit housing
        - 2) Additions & alterations
        - 3) Non-housekeeping (hotels/motels)
    - B. Non-residential buildings
        - 1) Industrial
        - 2) Office buildings
        - 3) Other commercial
        - 4) Religious
        - 5) Educational
        - 6) Hospital & institutional
        - 7) Misc. non-residential buildings
            - a. Amusement buildings
            - b. Residential garages
            - c. Other structures & bldgs.
    - C. Farm non-residential
    - D. Public utilities
        - 1) Telephone & telegraph
        - 2) Other public utilities
            - a. Gas
            - b. Electric light & power
            - c. Railroads
            - d. Petroleum pipelines
    - E. All other private
2. Public
    - A. Buildings
        - 1) Housing & redevelopment
        - 2) Industrial
        - 3) Educational
        - 4) Hospital
        - 5) Other public buildings
    - B. Highways & streets

C. Military facilities
D. Conservation & development
E. Other public construction
    1) Sewer systems
    2) Water supply facilities
    3) Misc. public construction

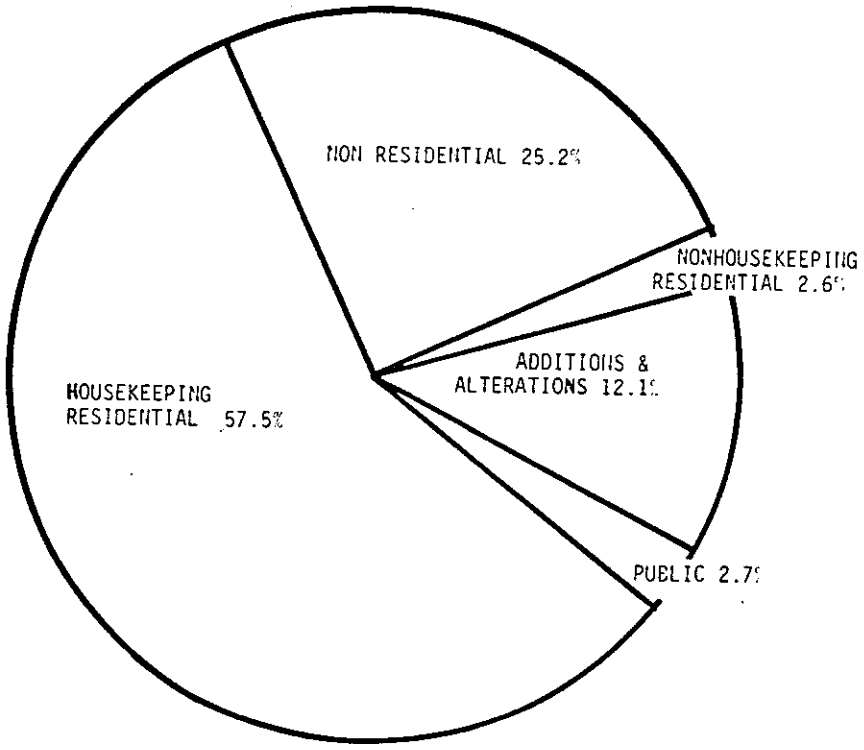
'Contract Construction', as defined by the Department of Labor, is categorized by type of contractor as follows:[2]

1. General building contractors
    A. Residential building
    B. Operative Builders
    C. Non-residential building
2. Heavy construction contractors
    A. Highway & street
    B. Heavy construction (except highway)
3. Special trade contractors
    A. Plumbing, heating and air conditioning
    B. Painting, paperhanging, & decorating
    C. Electrical work
    D. Masonry, stonework, & plastering
    E. Carpeting & flooring
    F. Roofing & sheetmetal
    G. Other

'Building Permit Activity', as collected and reported by the Bureau of Economic and Business Research at the University of Florida, categorizes that construction for which permits are required as listed below. Figure 3-1 and Table 3-1 shows the 1983 makeup of total value of building permits.[3]

1. Private
    A. Housekeeping residential
    B. Non-housekeeping residential
    C. Non-residential
    D. Additions and alterations

2.Public



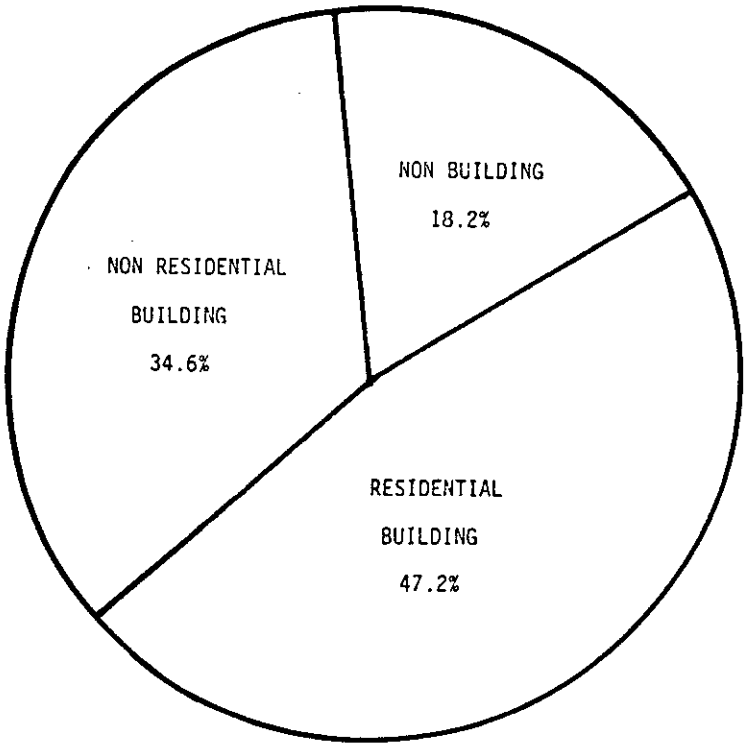
BUILDING PERMITS - 1983 [3]

FIGURE 3-1.

The 'Value of Construction Contracts', including new and additions & major alterations, both public and private, as reported by F.W. Dodge Division, is broken down by project type below. Figure 3-2 and Table 3-2 show value of construction contracts for 1982 as reported by the Bureau of Economic Analysis.[4]

1. Building construction
   A. Residential
      1) Housekeeping residential bldgs.

2) Non-housekeeping res. buildings
B. Non-residential buildings
1) Commercial building
2) Manufacturing buildings
3) Educational & science buildings
4) Hospital & health treatment bldgs
5) Public buildings
2. Non-building construction



CONSTRUCTION CONTRACTS - 1982 [4]

FIGURE 3-2.

The most detailed categorization of the economy is accomplished using the S.I.C. (Standard Industrial Classification) Codes. Tables 1-2, 2-2, 2-4, and 2-5 show these code categories. The listing at the end of the next paragraph shows the subsector codes that were grouped

together for the Input-Output analysis described in Chapters 4 and 5.

The Florida Contractor's Licensing Law, Chapter 489, F.S. requires licensing of most contractors in the State (there are a few exceptions). A listing of active contractors was obtained from the Department of Professional Regulation, Construction Industry Licensing Board and used to make Maps 3-1, 3-2, 3-3, 3-4, and 3-5. Each license number begins with two letters which designate the type of contractor license. With the exception of electrical contractors, the first letter indicates whether the license is Certified (by the State) or Registered (issued by the county and registered with the State). Electrical contractors are designated differently. ER is the Registered electrical contractor. The table below shows which contractors most closely are associated with the type of work category shown.

I-O MODEL	LICENSE	S.I.C.CODE
1 Residential (multifamily)	CG,RG General CB,RB Building CR,RR Residential	1522 General Contractor -residential building other than sgl family
2 Single family	SAME AS ABOVE	1521 General Contractors -single family 1531 Operative builders
3 Non-resid. (ex.whse/ind)	CG,RG General CB,RB Building	1542 General Contractors -non-residential other warehouse & industrial
4 Industrial & Warehouse	CG,RG General CB,RB Building	1541 General Contractors -industrial/warehouse
5 Heavy	CU Underground utility	1622 Bridge, tunnel, & elevated highway 1623 Water, sewer, pipeline, commun. & power lines 1629 Heavy construction

			contractors N.E.C.
6 Highway & street	--------	1611	Highway & street
7 Plumbing, heating, & air cond.	CF,RF Plumbing CM,RM Mechanical CA,RA Air cond. CS,RS Sheet metal	1711	Plumbing, heating, air conditioning
8 Specialty	--------	1721	Painting, decorating, paperhanging
		1751	Carpentering
		1752	Floor laying/floorwork
		1781	Water and well drilling
		1791	Structural steel erect.
		1793	Glass and glazing
		1794	Excavation/foundation
		1795	Wrecking/demolition
		1796	Installation of bldg. equipment N.E.C.
		1799	Specialty trade contractors N.E.C.
9 Electrical	EC,ER Electric	1731	Electrical work
10 Masonry, stone plaster, tile	--------	1741	Masonry, stone setting, stonework
		1742	Plaster, drywall, acoustical & insulation
		1743	Terrazzo, tile & marble
11 Roofing & sheetmetal	CC,RC Roofing	1761	Roofing & sheet metal work
12 Concrete	---------	1771	Concrete work

In addition to the twelve construction categories above, the I-O model has a category for mining, and one for prefabricated wood products & mobile homes. Subdividers and developers, S.I.C. 6552, are included in the finance, insurance and real estate sector.

U.S. CENSUS DEFINITIONS AND ASSUMPTIONS

"For this census, a 'construction establishment' was defined as a relatively permanent office or other place of business at which or from which the usual business

activities related to construction were conducted. A separate census report was required from each establishment but not from each construction site. Instead, the data for work at each site were included in the report from the appropriate office or branch office. Foreign construction activities were not included in this census."

"The 1982 estimates for establishments with paid employees in all of the construction industries are based on reports from a probability sample of approximately 172,000 establishments selected from a universe of about 498,000 construction establishments with payroll. The data obtained from the sample were weighted to represent all construction establishments with payroll."

"All data shown are based on current dollars for the years specified and have not been adjusted for inflation."[5]

U.S. CONSTRUCTION INDUSTRY DATA

Employment in construction (U.S.) has risen from 4,233,658 in 1977 to 4,320,275 for 1982, less than 3%.

Of 1982 employment in construction, 1,066,529 people were employed by General building contractors and operative builders (S.I.C. Code 15). Heavy construction, general contractors (S.I.C. Code 16) employed 825,130 people. Specialty trade contractors (S.I.C. Code 17) employed 2,428,616 people.[6]

Total construction receipts have risen from

$213,032,139,000 in 1977 to $310,622,566,000 for 1982, approximately 46%.[7]

Net construction receipts, which is defined as total construction receipts less payments for construction work subcontracted to others, were $234,379,988,000 for 1982. Of this total general building contractors and operative builders claimed $60,617,973,000; heavy construction general contractors claimed $52,719,253,000; and specialty trade contractors claimed $121,042,762,000.[8]

Value added is defined as all business receipts less payments for construction work subcontracted to others, and less payments for material, components, supplies, and fuels. In the case of operative builders receipts for the land portion are subtracted from 'business receipts'.

Construction industry value added was $98,116,143,000 in 1977 and $146,978,736,000 for 1982.[9]

II. MINING

MATERIALS AND USES

As pointed out in Chapter 2, mining in Florida is approximately 30 percent construction related. This section covers those materials and their uses.

Limestone is sedimentary rock made up of 50% or more of the minerals calcite (calcium carbonate) and dolomite (calcium magnesium carbonate), with calcite being the

predominate mineral.[10]

Construction uses of limestone include; crushed stone for concrete aggregate and sewage filter beds, ground stone for stucco, filler, and whiting, as a fluxing agent in metal smelting, as dimension stone, as a chemical raw material, as an abrasive, and in glassmaking and acid neutralization. Limestone is the basic raw material in the manufacture of portland cement and, of course, lime. It is used in in the production of paint pigments. Limestone is sometimes used for roof gravel and in the production of concrete blocks.

"The largest percentage of limestone produced in Florida is used for road base. The limestone can be used as a surface treatment aggregate to improve unstabilized roads, as bituminous aggregate for road pavement, or more commonly as a limerock base and stabilized base material". Eighty eight percent (88%) of florida's 1966 limestone production was for roadbase and concrete aggregate. For 1975 it was 87.2%.[11]

Dolomite is defined as limestone containing more dolomite than calcite. High-grade refractory materials are made from dolomite. Another use for limestone and dolomite is rip rap to control erosion.

Coquina is mainly cemented mollusk shells held loosely together by a calcareous cement. It varies from a sandy limestone, to a calcareous sandstone, to unconsolidated sand and shells.

Harder layers of coquina have long been used as building stones. The most common use of coquina at present is for road base.

The fine to coarse quartz sand and the silica gravel found in Florida are used in construction also as concrete aggregate and road base. In addition sand is used for aggregate in mortar, concrete block, and stucco.

MINING SITES

Aggregate limestone is mined in Dade, Broward, Palm Beach, Monroe, Collier, and Lee counties in South Florida, also in Okeechobee, Hernando, and Suwannee counties.

Soft-rock limestone accounts for approximately 63% of the total limestone output and is more evenly distributed over the State. The Ocala group of limestones are mined in Suwannee, Columbia, Gilcrist, Levy, Alachua, Marion, Sumter, Citrus, and Hernando counties. The Miami limestone group is mined south of the 28th degree parallel. Shell base of clam or oyster shells make up 80-90% of the beach ridge along the Atlantic coast, and to a lesser degree the sediments along the Manatee, Sarasota, and Charlotte county coasts. Marl occurs along all the coasts and along the deep stream cuts of Holmes, Washington, Walton, and Okaloosa counties of West Florida.

Dolomite is mined in Citrus, Jackson, Levy, and Taylor counties. Coquina is mined in Brevard, Orange, and Palm

Beach counties.[12]

Most of the gravel produced in the State comes from dredgings in the Flint River. Small deposits are found in Jackson, Escambia, and Santa Rosa counties.[13] Sand mining is widely distributed over the State.

ECONOMIC FACTORS AND FUTURE TRENDS

The rapid growth in the limestone mining industry in the past is attributable to the increase in highway construction, the growth of the building construction industry and an expansion in the chemical processing industries.

"The sharp downturn in production recorded in 1974 was directly attributable to a recession and consequent slowdown in the construction and road-building industries. Further reduction in limestone production in 1975 reflected this continued downward trend in the number of homebuilding and highway projects." [14]

Demand for cement and crushed stone parallels demand for construction. Demand for cement more closely relates to building construction demand; and demand for crushed stone more closely relates to the demand for highway and street construction.

The demand for construction minerals in Florida should show moderate growth for the foreseeable future. The continued growth in building construction and the more

moderate growth in highway and street construction should form the basis for the continuing demand for these minerals.

III. SINGLE FAMILY RESIDENTIAL & OPERATIVE BUILDERS

CENSUS DATA

In this section both Single family residential contractors, S.I.C. Code 1521, and Operative builders, S.I.C. Code 1531, are discussed.

Florida employment, total receipts, and value added comparisons are made in the following paragraphs for the years 1977 and 1982. It should be kept in mind that inflation is not factored out of the dollar values reported. The Bureau of the Census, new one-family house excluding lot value construction cost index, for example, shows a 58.2% increase from the 1977 level=100 to the 1982 level=158.2.[15] Engineering News Record, ENR, gives a cost index for buildings of 144.4 for 1982 with 1977=100.[16] The consumer price index during the same period rose from 181.5 to 289.1, an increase of 59.3%.[17]

The 'General Contractors - Single-Family Houses' category, is defined as establishments engaged primarily in the construction of single-family houses, rowhouses, and townhouses (including new work, additions, alterations, remodeling, and repair).

Employment by this category of general contractors rose

15.7% from its 1977 level of 22,381 people to a 1982 level of 25,883.[18]

Florida single family contractors had total receipts in 1982 of $1,914,198,000 up 50% from $1,274,727,000 for 1977. Net receipts for 1982 were $1,350,152,000. Value added was $720,684,000 for 1982 up 65.5% from its 1977 level of $435,541,000.[19]

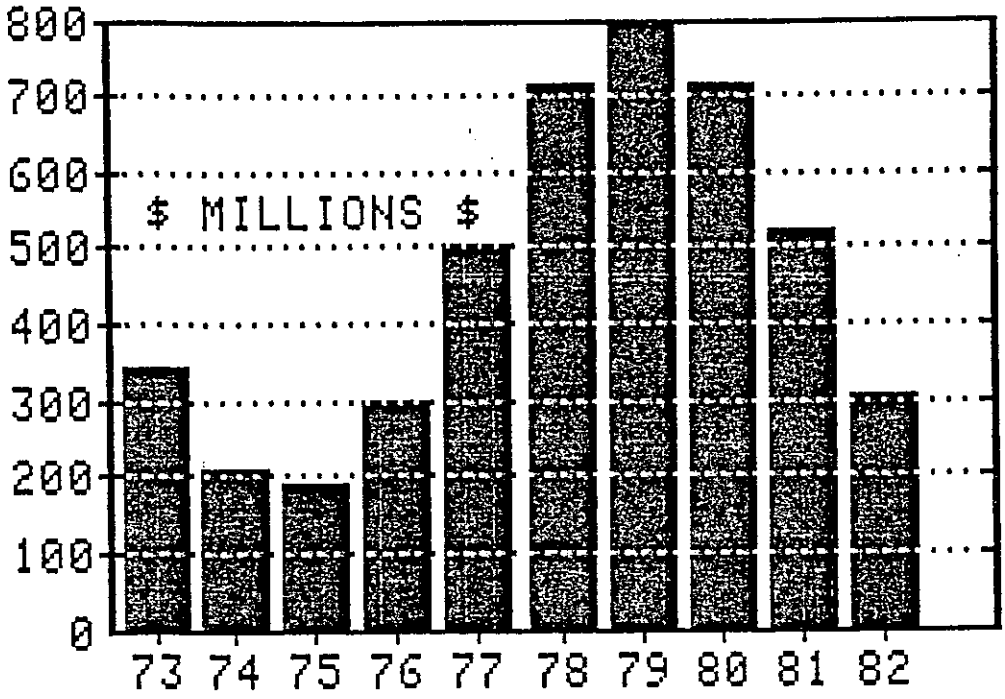
'Operative Builders' are defined as establishments primarily engaged in the construction of single-family houses and other buildings for sale on their own account rather than as contractors. This group includes speculative builders and condominium developers.

Florida operative builders employed 14,121 people in 1982, a decrease of 10.8% from their 1977 employment of 15,837.[20]

Total construction receipts rose 53.8% from their 1977 level of $1,304,402,000 to a 1982 level of $2,006,384,000. Net receipts for 1982 were $1,084,452,000. Value added for 1982 was $741,084,000 up 124% from the 1977 total of $330,528,000.[21]

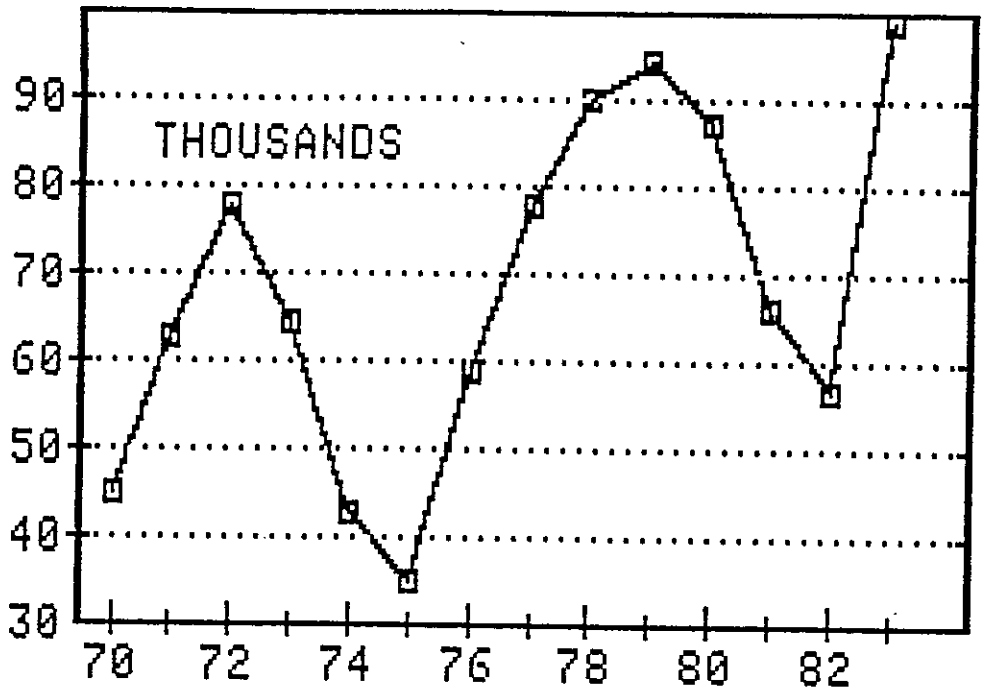
ECONOMIC NATURE

Single family contracting, and operative building are the most consumer oriented sectors of the construction industry. They are also the most affected by changes in



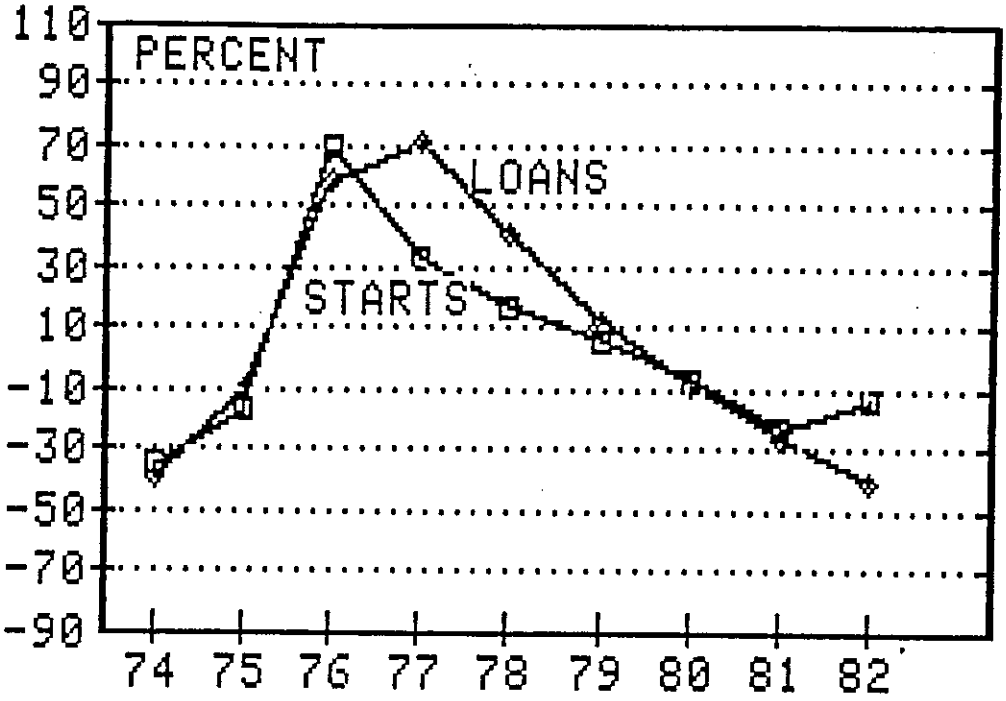
SINGLE FAMILY HOUSING LOANS [23]
1973 - 1982
FIGURE 3-3

consumer economics. Table 3-3 lists the amounts and Figure 3-3 graphs the trend in single family housing loans from 1973. Note the dip in 1974-76 and the decline from 1979 through 1982. Nearly all new single family housing requires



SINGLE FAMILY HOUSING STARTS [24]
1970 - 1983
FIGURE 3-4

financing. Single family housing starts are shown in Figure 3-4. Compare the two figures and note the trends in corresponding years. The yearly percent changes in starts and loans were calculated and graphed together in Figure 3-5. The correlation is obvious.



SINGLE FAMILY LOANS & STARTS
CHANGE FROM PREVIOUS YEAR [25]
FIGURE 3-5 .

The recession, high interest rates, and inflation slowed population migration to Florida from 1979 through 1982. One of the major causes for this slowdown is found in the decreasing affordability of housing during that period of time. Table 3-4 shows the 'Housing Affordabiltiy Index' as derived by the National Association of Realtors. It shows the effect of rising interest rate on the ability of median family income to afford mortgage payments. This index dropped from 97.2 for 1979 to 69.5 for 1982. With the drop interest rate to 12.85% in 1983 this index rose to

83.6.

Construction in these two single family housing sectors affects many other sectors of the economy. Money received by this sector is in turn paid out for construction costs in the following approximate ratios:[27]

Construction labor	4 percent
Lot costs	16 percent
Subcontracted labor	19 percent
Materials	34 percent
Financing	27 percent

Buying a home may act as a catalyst for other purchases. The following chart shows the number of new home buyers out of 100 that are planning to purchase the listed items:[28]

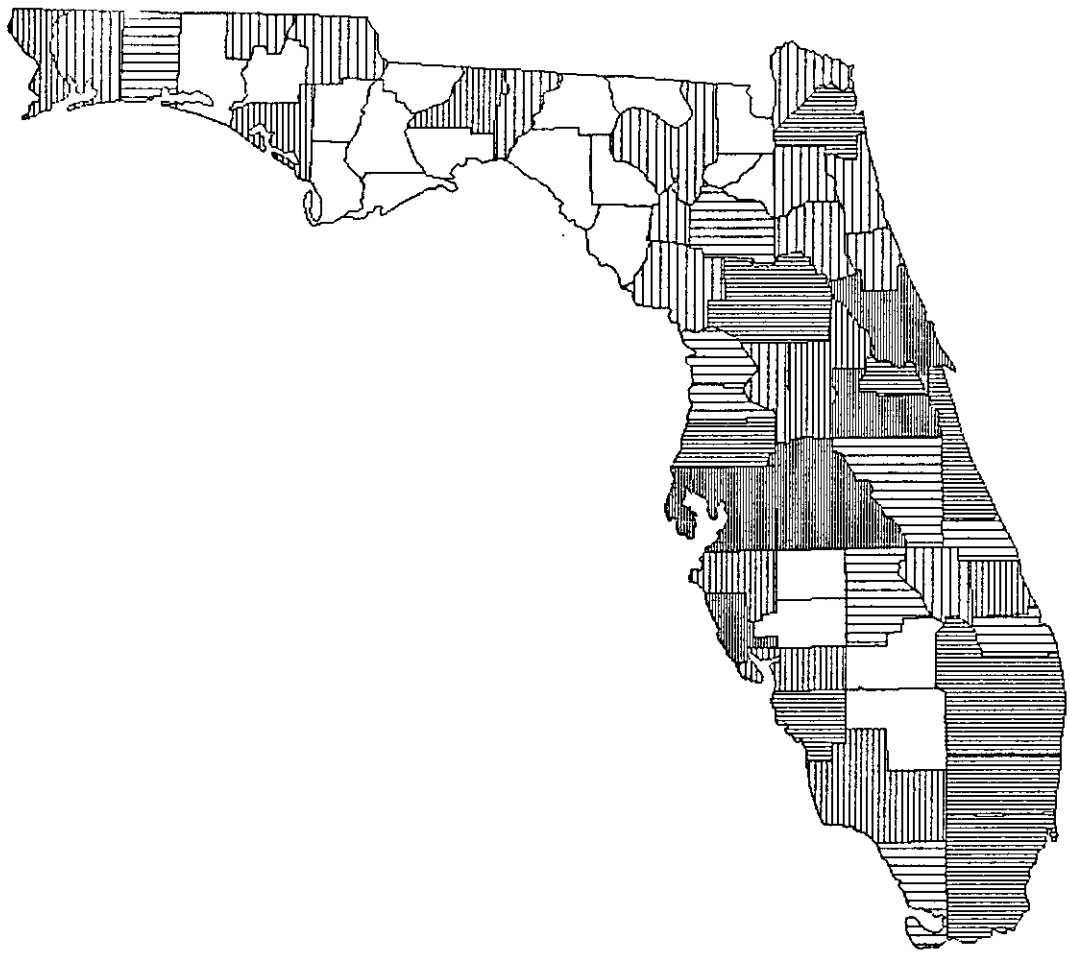
Drapes	95
Furniture	93
Landscaping material (over $1000)	89
Power tools	65
Decorating changes	62
Additions or improvements	61
Washer and/or dryer	59
Fencing	56
Major kitchen appliances	32
Gourmet cooking accessories	32

CONTRACTOR DISTRIBUTION & LEADING HOUSING MARKETS

Map 3-1 shows the distribution of active licensed residential contractors in Florida. Florida license law lets holders of the residential license build up to two stories and up to three unit residential structures. General contractors and building contractors may also build

RESIDENTIAL CONTRACTORS [29]

(CR,RR)



CONTRACTORS

- LESS THAN 10
- 10 TO 49
- 50 TO 99
- 100 TO 149
- 150 TO 299
- 300 AND UP

MAP 3-1

these structures so Map 3-1 may not accurately reflect the numbers of contractors involved in single family home construction.

Florida should have five areas in the nation's top twenty housing markets for 1984. 1984 housing start estimates and rank are shown below.[30]

7.	West Palm Beach	24,300
9.	Tampa - St. petersburg	22,200
13.	Orlando	19,870
18.	Fort Lauderdale	16,050
20.	Miami	14,350

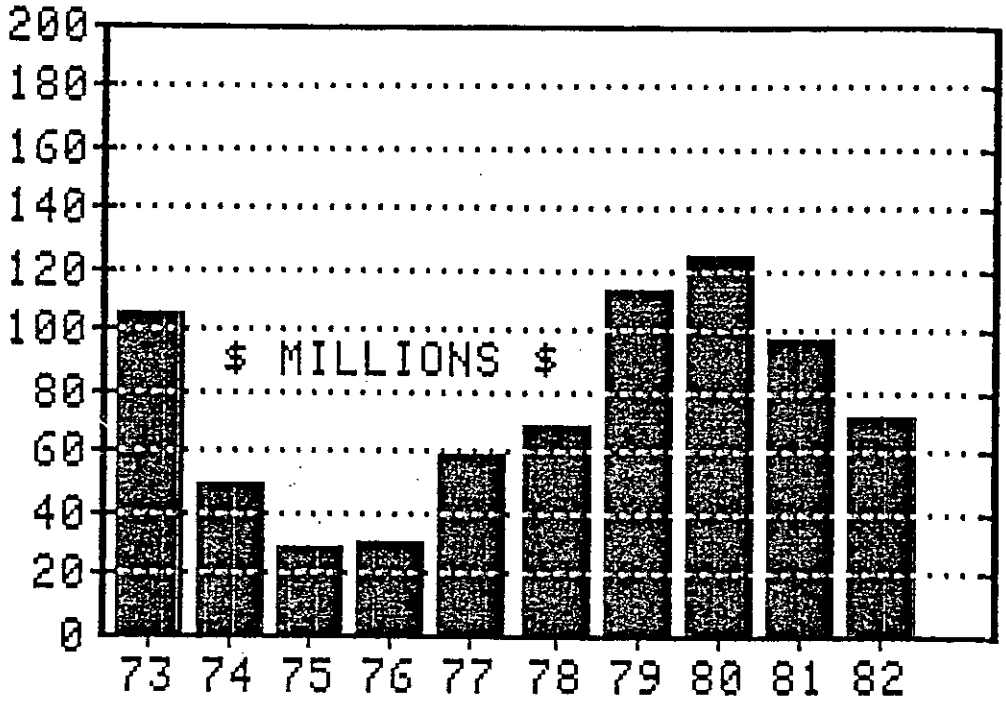
IV. GENERAL BUILDING CONTRACTORS - OTHER THAN SINGLE FAMILY

RESIDENTIAL OTHER THAN SINGLE FAMILY

The Bureau of the Census defines this category as establishments engaged primarily in the construction of apartment buildings, hotels, motels, and dormitories (including new work, additions, alterations, remodeling, and repair).

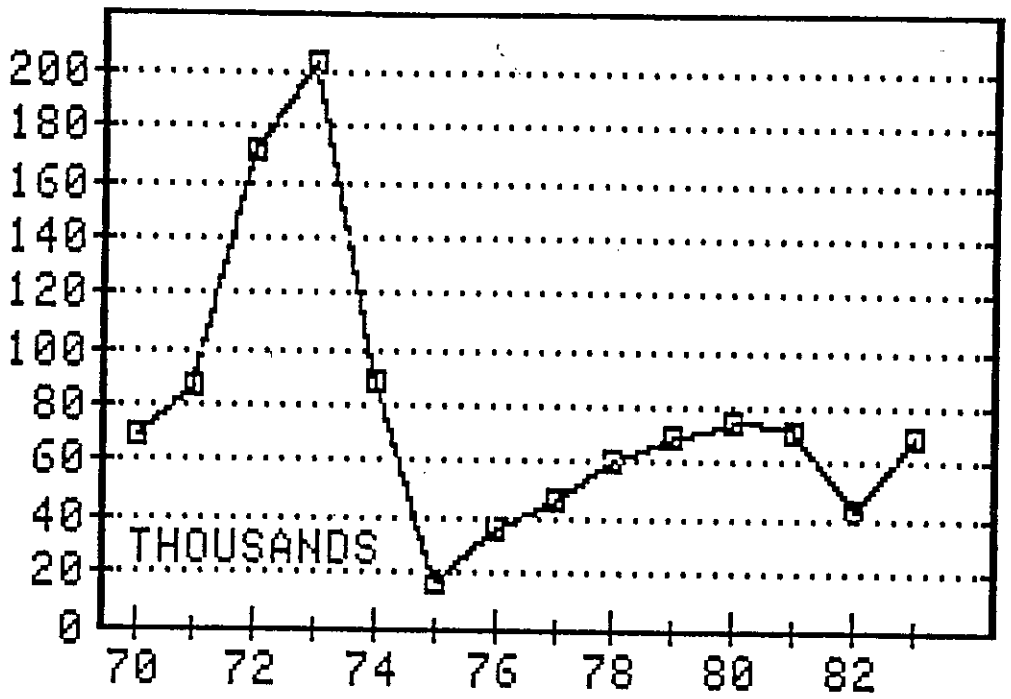
Florida employment by firms in this category rose 97.5% from the 1977 level of 3,970 people to a 1982 level of 7,842.[31]

Total receipts for Florida contractors in this group during 1982 were $1,056,985,000 up 279% from $278,699,000 for 1977. Net receipts for 1982 were $464,321,000. Value added was $265,915,000 for 1982 up 271% from its 1977 level of $71,613,000.[32]



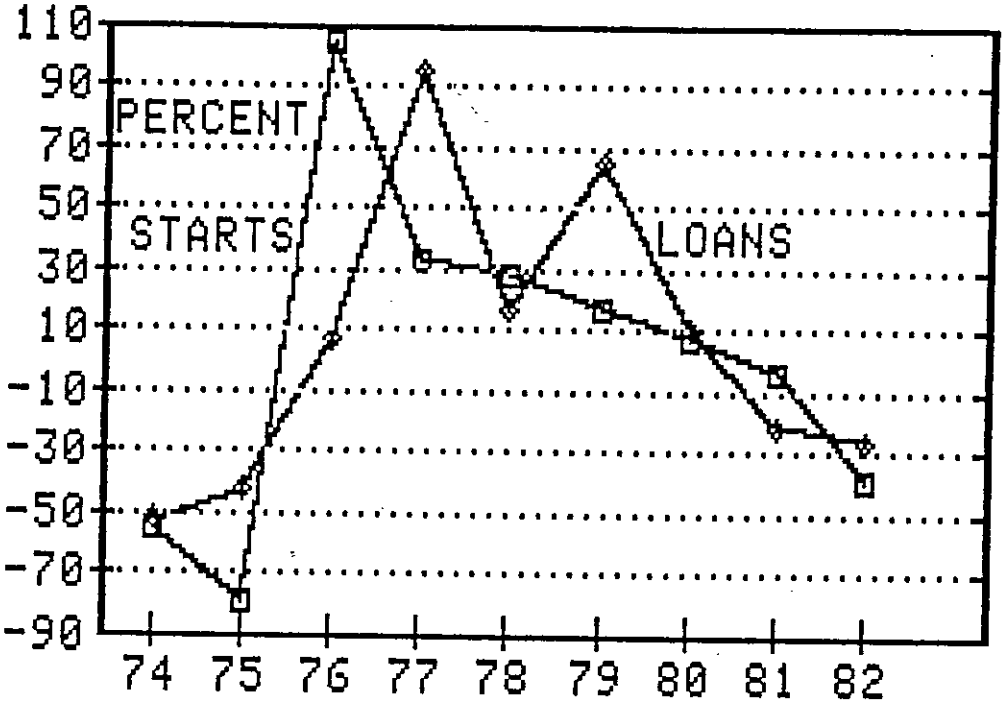
MULTIFAMILY HOUSING LOANS[33]
1973 - 1982
FIGURE 3-6 .

Figures 3-6 and 3-7 will not show this same increase in loans and starts for multi-family housing at first glance. A resolution of this apparent inconsistency is given by a closer look at what each source of information is reporting. Figures 3-6 and 3-7 are loans and 'starts' which are reported at beginning of project. The census data is 'receipts' which occur after work is accomplished. If starts and loans for 1976 and 1981 are compared with receipts for 1977 and 1982 respectively, the correlation holds true.



MULTIFAMILY HOUSING STARTS[34]
1970 - 1983
FIGURE 3-7 .

Figure 3-8 shows the relationship between financing and starts for multi-family construction.



MULTIFAMILY LOANS & STARTS
CHANGE FROM PREVIOUS YEAR [35]
FIGURE 3-8

NON-RESIDENTIAL - OTHER THAN INDUSTRIAL & WAREHOUSE

This category consists of establishments engaged primarily in the construction of commercial, institutional, religious, and amusement and recreational buildings (including new work, additions, alterations, remodeling, and repair).

This non-residential category employed 18,717 people in 1982, an increase of 72.8% from its 1977 employment of 10,827. [36]

Total construction receipts rose 162% from their 1977

level of $817,757,000 to a 1982 level of $2,139,400,000. Net receipts for 1982 were $969,278,000. Value added for 1982 was $551,937,000 up 200% from the 1977 value added of $184,105,000.[37]

INDUSTRIAL & WAREHOUSE

Establishments in this category are primarily engaged in the construction of industrial buildings such as aluminum plants, automobile assembly plants, pharmaceutical manufacturing plants, and commercial warehouses (including new work, additions, alterations, remodeling, and repair).

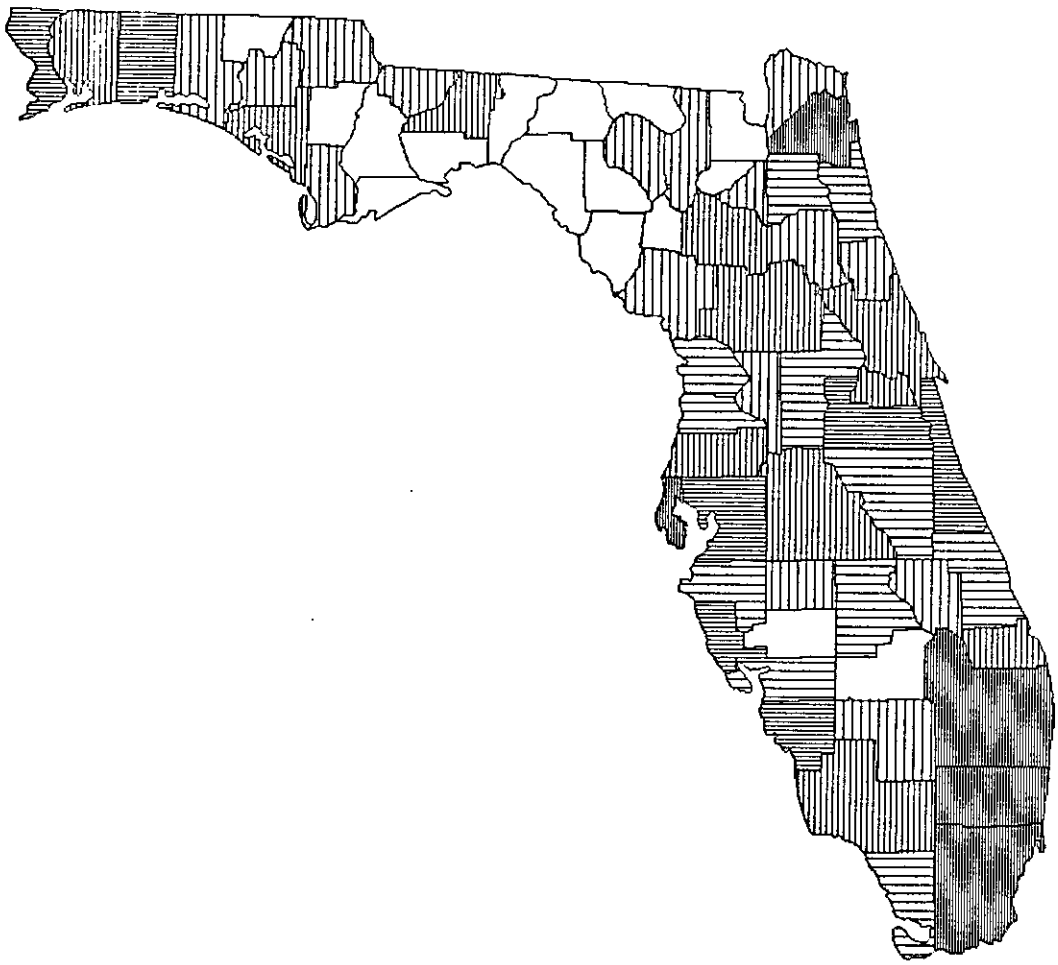
Florida industrial and warehouse contractors employed 5,036 people in 1982, a decrease of 2.5% from their 1977 employment of 5,165.[38]

Total construction receipts rose 66.8% from their 1977 level of $302,999,000 to a 1982 level of $505,501,000. Net receipts for 1982 were $248,643,000. Value added for 1982 was $125,992,000 up 121% from the 1977 total of $57,017,000.[39]

Map 3-2 shows the distribution of contractors holding 'general contractor' and 'building contractor' licenses in Florida. Building contractors are limited to construction of buildings no more than three stories in height. Although these contractors may be involved in single family residential construction, they are linked more closely with non-residential building construction including industrial and warehouse. See Table 3-5 for the number of CG, RG, CB,

GENERAL CONTRACTORS & BUILDERS[40]

(CG,RG,CB,RB)



CONTRACTORS

- LESS THAN 25
- 25 TO 99
- 100 TO 249
- 250 TO 499
- 500 TO 999
- 1000 AND UP

MAP 3-2.

& RB licenses per county.

V. HEAVY CONSTRUCTION

This category consists of three subcategories: Bridge, tunnel, and elevated highway (S.I.C. 1622); Water, sewer, pipeline, communication and power line (S.I.C. 1623); and, Heavy construction contractors N.E.C. (S.I.C. 1629).

BRIDGE, TUNNEL, & ELEVATED HIGHWAY

These construction contractors are those establishments that are engaged primarily in the construction of bridges, viaducts, elevated highways; and highway, pedestrian, and railway tunnels.

These bridge and tunnel contractors employed 1,675 people in 1982, an increase of 84.9% from their 1977 employment of 906.[41]

Total construction receipts for bridge and tunnel contractors rose 207% from their 1977 level of $41,329,000 to a 1982 level of $126,812,000. Net receipts for 1982 were $107,300,000. Value added for 1982 was $70,192,000 up 306% from the 1977 value added of $17,296,000.[42]

WATER, SEWER, PIPE LINE, COMMUNICATION, & POWER LINE

Water, sewer, etc. construction contractors are defined as those establishments engaged primarily in the construction of pipe lines, communication and power lines,

and sewer and water mains. This group also includes contractors engaged in construction of pumping stations, television and radio towers, and telephone lines.

This category of heavy contractors employed 10,438 people in 1982, an increase of 39.0% from their 1977 employment of 7,510.[43]

Total construction receipts for water, sewer, etc. contractors rose 105% from their 1977 level of $292,698,000 to a 1982 level of $601,282,000. Net receipts for 1982 were $505,800,000. Value added for 1982 was $315,716,000 up 103% from the 1977 total of $155,791,000.[44]

HEAVY CONSTRUCTION CONTRACTORS, N.E.C.

This category of contractors are those establishments primarily engaged in heavy construction projects not elsewhere classified, (N.E.C.), such as construction of chemical complexes, dams and reservoirs, harbor and port facilities, missile facilities, oil refineries, subways, water and sewage treatment plants, light and power plants, industrial ovens and incinerators, flood control projects, and dredging and demolition contractors.

Florida heavy construction contractors N.E.C. employed 9,023 people in 1982, an increase of 18.3% from their 1977 employment of 7,626.[45]

Total construction receipts for this group rose 46.8% from their 1977 level of $471,929,000 to a 1982 level of

$692,565,000. Net receipts for 1982 were $589,695,000. Value added for 1982 was $409,563,000 up 92.9% from the 1977 total of $212,302,000. [46]

There is no 'heavy contractor' licensing requirement in Florida. The only related licensing requirement is for 'underground utilities contractor'. The distribution of underground utilities contractors is shown by Map 3-3. Duval county leads with 11 CU licensed contractors. Broward county is next with 10. See Table 3-5 for the number of licenses per county.

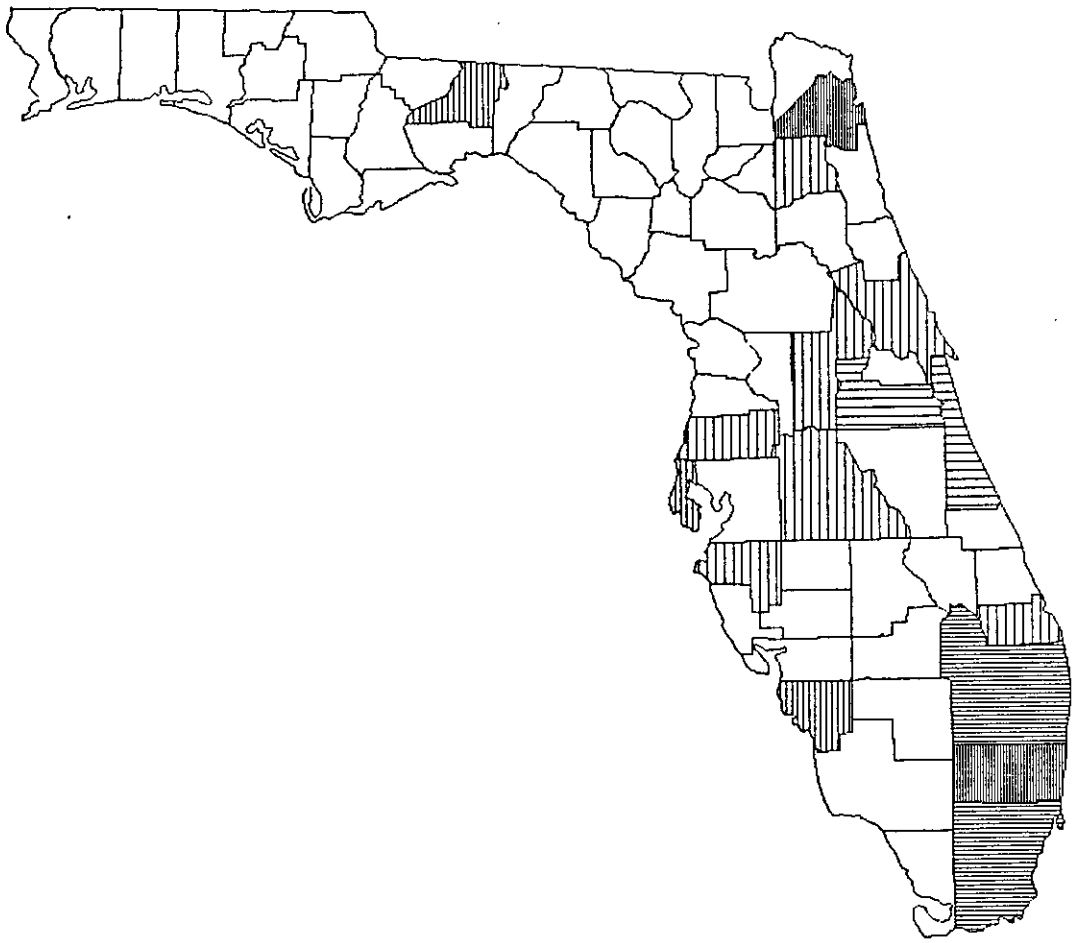
VI. HIGHWAY & STREET

Highway and street construction contractors are those primarily engaged in the construction of roads, streets, alleys, sidewalks, guardrails, parkways, parking areas, airports, and athletic fields.

These contractors employed 9,972 people in 1982, a decrease of 19.4% from their 1977 employment of 12,376. [48]

Total construction receipts rose 23.7% from their 1977 level of $597,128,000 to a 1982 level of $738,523,000. Net receipts for 1982 were $576,549,000. Value added for 1982 was $345,239,000 up 29.5% from the 1977 value added of $266,601,000. [49]

UNDER-GROUND UTILITY CONTRACTORS [47]
(CU)



MAP 3-3.

VII. PLUMBING, HEATING, AIR CONDITIONING

These special trade contractors are engaged in plumbing, heating (except electric), or air conditioning work or any combination of these types of work. Sheet metal work combined with any of these types of work is included in this industry, but roofing and sheet metal contractors are not.

Plumbing, heating, and air conditioning contractors employed 33,728 people in 1982, an increase of 54.7% from their 1977 employment of 21,809. [50]

Total construction receipts rose 127% from their 1977 level of $825,354,000 to a 1982 level of $1,874,754,000. Net receipts for 1982 were $1,699,412,000. Value added for 1982 was $920,239,000 up 128% from the 1977 total of $403,149,000.[51]

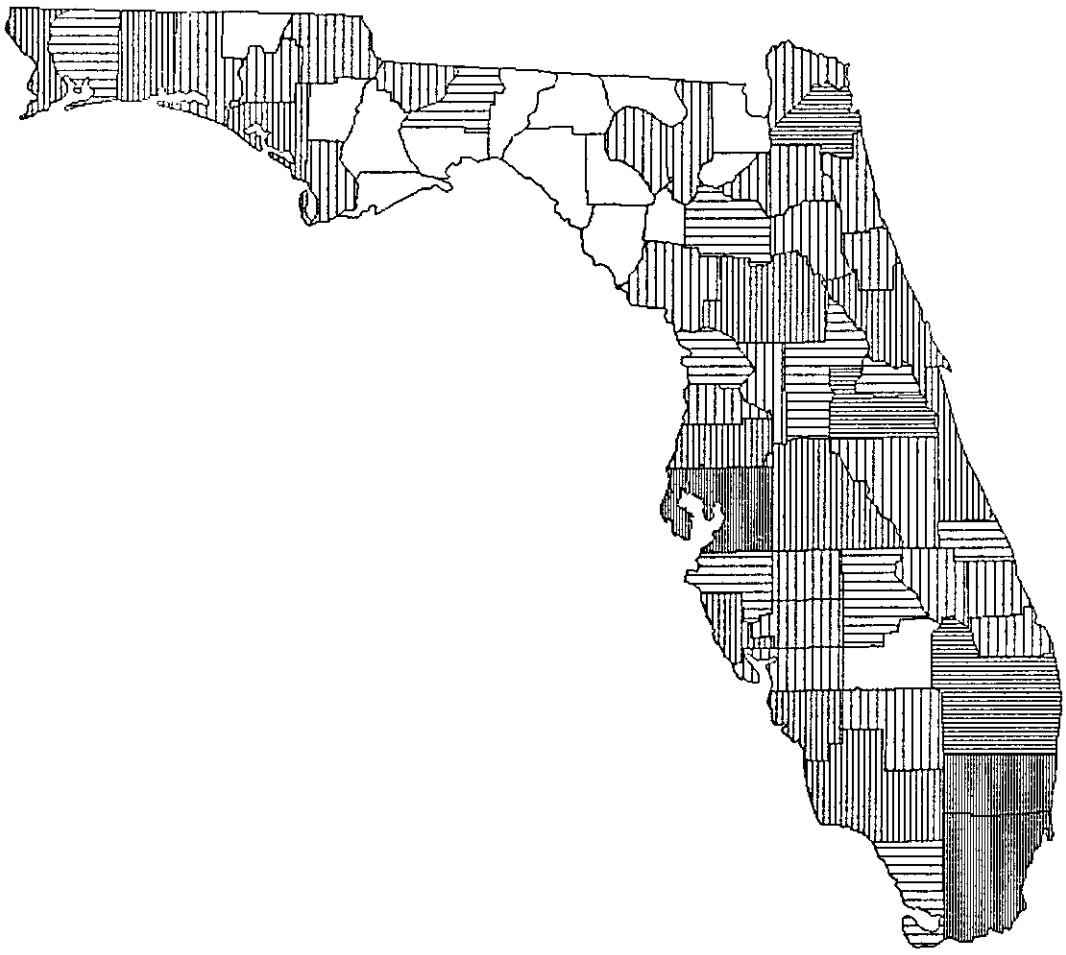
Map 3-4 shows the distribution of CM, RM, CA, RA, CF, RF, CS, and RS licenses. Table 3-5 gives the number of licenses for each county.

VIII. ELECTRICAL

Electrical contractors are those establishments primarily engaged in electrical work at the construction site. This industry also includes electric heating contractors and establishments engaged in the installation

PLUMBING & MECHANICAL CONTRACTORS [52]

(CM,RM,CA,RA,CF,RF,CS,RS)



CONTRACTORS

- LESS THAN 10
- 10 TO 49
- 50 TO 99
- 100 TO 199
- 200 TO 299
- 300 AND UP

MAP 3-4.

of intercommunication equipment, sound equipment, burglar alarms, fire alarms, and telephones.

Electrical contractors in Florida employed 26,380 people in 1982, an increase of 45.0% from their 1977 employment of 18,191.[53]

Total construction receipts rose 108% from their 1977 level of $615,518,000 to a 1982 level of $1,277,914,000. Net receipts for 1982 were $1,251,103,000. Value added for 1982 was $707,700,000 up 104% from the 1977 total of $346,658,000.[54]

Map 3-5 shows the distribution of EC and ER licensed contractors throughout the State. Table 3-5 gives the number of licenses per county.

IX. ROOFING AND SHEET METAL

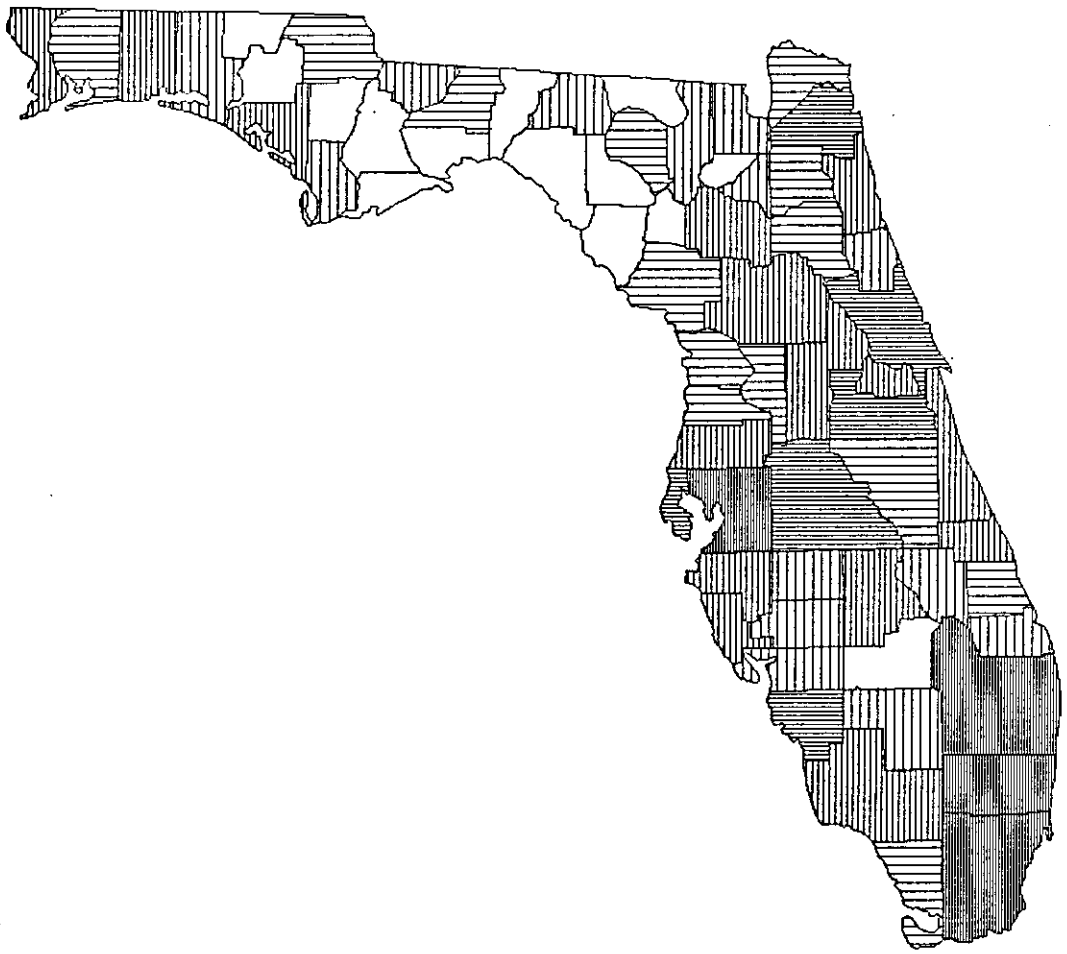
This category consists of those contractors primarily engaged in the installation of siding and roofing (including roof spraying, painting, or coating). this industry also includes contractors engaged in sheet metal work, except that done in connection with plumbing, heating, or air conditioning.

Florida roofing and sheet metal contractors employed 14,962 people in 1982, an increase of 65.9% from their 1977 employment of 9,018.[56]

Total construction receipts for this industry rose 139%

ELECTRICAL CONTRACTORS [55]

(ER,EC)



MAP 3-5.

from their 1977 level of $273,759,000 to a 1982 level of $653,299,000. Net receipts for 1982 were $624,872,000. Value added for 1982 was $348,822,000 up 138% from the 1977 total of $146,795,000.[57]

Map 3-6 shows the distribution of CC and RC contractor licenses in the State. Table 3-5 gives numbers of licenses per county.

X. MASONRY, STONE, PLASTERING, TERRAZZO, TILE, & MARBLE

Three S.I.C. categories make up this group: Masonry, stone setting, and other stonework (S.I.C. 1741), Plastering, drywall, acoustical and insulation work (S.I.C. 1742), and Terrazzo, tile, marble, and mosaic work (S.I.C. 1743).

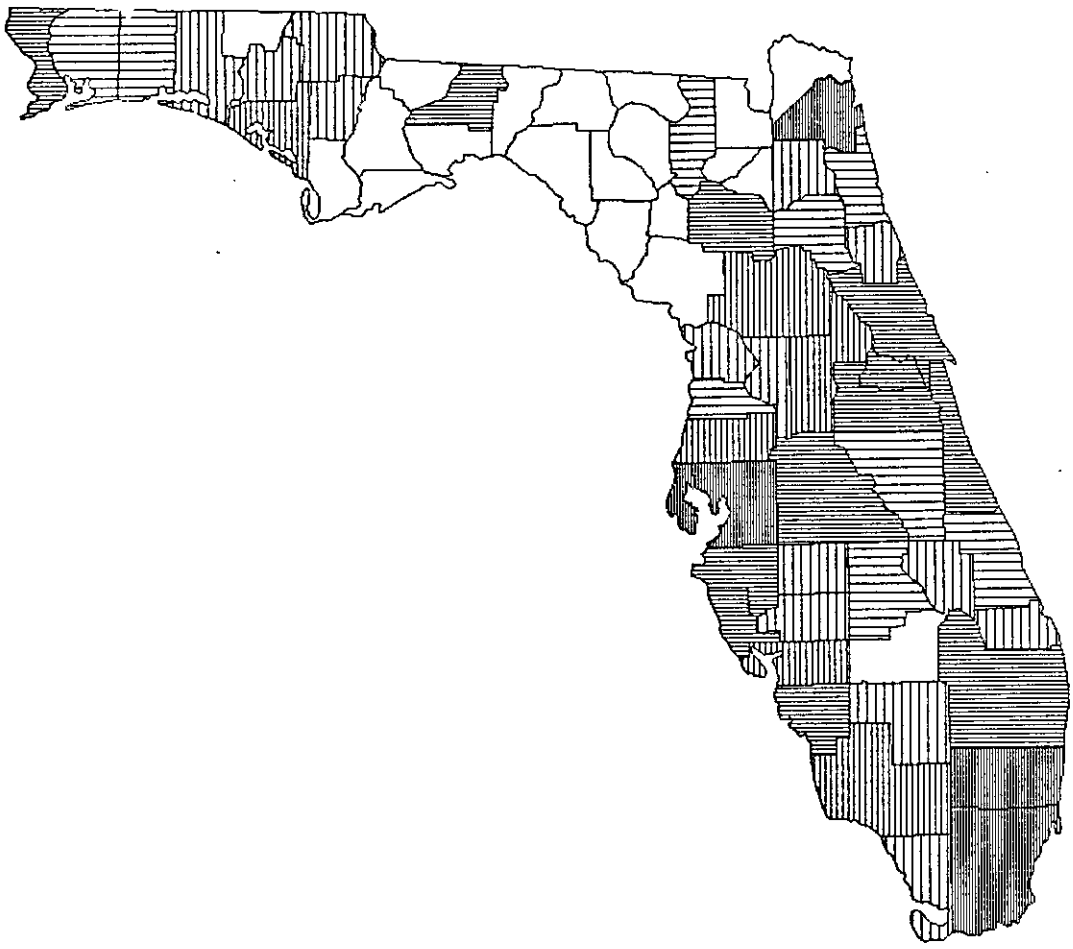
MASONRY, STONE SETTING, & OTHER STONEWORK

The masonry category consists of contractors primarily engaged in masonry work, stone setting and other stonework, including boiler setting contractors, bricklaying contractors, cement block laying contractors, chimney construction contractors, exterior marble work contractors, and tuck pointing contractors.

These contractors employed 7,217 people in 1982, an increase of 4.9% from their 1977 employment of 6,879.[59]

Total construction receipts for masonry contractors

ROOFING CONTRACTORS [58]
(CC,RC)



CONTRACTORS

- LESS THAN 5
- 5 TO 14
- 15 TO 29
- 30 TO 49
- 50 TO 149
- 150 AND UP

MAP 3-6.

rose 58.3% from their 1977 level of $130,165,000 to a 1982 level of $206,042,000. Net receipts for 1982 were $194,425,000. Value added for 1982 was $121,352,000 up 43.3% from the 1977 total of $84,709,000. [60]

PLASTERING, DRYWALL, ACOUSTICAL, & INSULATION WORK

These contractors are the second category in the grouping for this study. Contractors in this category are those primarily engaged in applying plaster, plain or ornamental; the installation of lathing or other appurtenances to receive plaster; or in drywall, acoustical, and building insulation work.

These plaster, drywall, etc. contractors employed 15,236 people in 1982, an increase of 68.7% from their 1977 employment of 9,032. [61]

Total construction receipts rose 124% from their 1977 level of $263,660,000 to a 1982 level of $590,013,000. Net receipts for 1982 were $553,519,000. Value added for 1982 was $341,024,000 up 132% from the 1977 value added of $147,076,000. [62]

TERRAZZO, TILE, MARBLE, & MOSAIC WORK

The third category included in the grouping is composed of contractors engaged primarily in setting and installing ceramic tile, marble, and mosaic, and in mixing marble particles and cement to make terrazzo at the site of

construction. This category also includes contractors engaged in fresco work and mantel work.

These tile, marble, etc. contractors employed 2,453 people in 1982, an increase of 17.3% from their 1977 employment of 2,091.[63]

Total construction receipts rose 66.9% from their 1977 level of $60,164,000 to a 1982 level of $100,421,000. Net receipts for 1982 were $97,056,000. Value added for 1982 was $52,798,000 up 69.3% from the 1977 total of $31,192,000.[64]

XI. CONCRETE WORK

Contractors in this category are primarily engaged in concrete work and the surfacing of concrete floors, applying seal to concrete or asphalt surfaces, constructing with gunite and stucco, and constructing private driveways and walks of all materials.

Concrete contractors employed 10,833 people in 1982, an increase of 88.1% from their 1977 employment of 5,759.[65]

Total construction receipts rose 335% from their 1977 level of $130,403,000 to a 1982 level of $567,171,000. Net receipts for 1982 were $504,771,000. Value added for 1982 was $316,316,000 up 282% from the 1977 total of $82,789,000.[66]

XII. SPECIAL TRADE CONTRACTORS N.E.C.

This group consists of specialty trades which have not elsewhere been classified. The U.S. census classifies the contractors shown before under headings VII. through XI. as special trade contractors. For this study, however, those contractors have been treated separately. The following sections cover the remaining special trade contractors.

PAINTING, PAPER HANGING, & DECORATING

These contractors (S.I.C. 1721) are engaged in interior and exterior painting (except roofs), paper hanging, and decorating.

Their 1982 employment was 8,932, a 36.0% increase over the 1977 employment of 6,570.[67]

Total construction receipts rose 83.0% from $139,377,000 for 1977 to $255,052,000 for 1982. Net receipts were $230,231,000 for 1982. Value added increased 71.9% from $97,328,000 for 1977 to $167,294,000 for 1982.[68]

CARPENTERING

These contractors (S.I.C. 1751) are engaged in carpentry work and the installation of prefabricated windows and doors (except revolving doors). Ship joinery contractors are also included in this industry.

Their 1982 employment was 7,885, a 34.7% increase over their 1977 employment of 5,856.[69]

Total construction receipts rose 106% from $122,447,000

for 1977 to $252,429,000 for 1982. Net receipts were $224,973,000 for 1982. Value added increased 75.5% from $77,169,000 for 1977 to $135,401,000 for 1982.[70]

FLOOR LAYING & OTHER FLOORWORK

These contractors (S.I.C. 1752) are engaged in laying, scraping, finishing, or refinishing of parquet and other hardwood flooring. This industry also includes contractors that install asphalt tile, linoleum, and mastic and resilient flooring.

Their 1982 employment was 1,252, a 0.2% decrease from their 1977 employment of 1,255.[71]

Total construction receipts rose 2.3% from $50,563,000 for 1977 to $51,725,000 for 1982. Net receipts were $47,835,000 for 1982. Value added increased 20.0% from $20,173,000 for 1977 to $24,212,000 for 1982.[72]

WATER WELL DRILLING

These contractors (S.I.C. 1781) are engaged in water well drilling and servicing water wells.

Their 1982 employment was 1,047, a 16.9% increase over their 1977 employment of 896.[73]

Total construction receipts rose 59.3% from $36,076,000 for 1977 to $57,461,000 for 1982. Net receipts were $55,751,000 for 1982. Value added increased 56.2% from $19,823,000 for 1977 to $30,970,000 for 1982.[74]

STRUCTURAL STEEL ERECTION

These contractors (S.I.C. 1791) are engaged in the erection of structural steel, the placing of concrete reinforcement and structural iron work, and the erection of metal storage tanks.

Their 1982 employment was 3,581, a 66.3% increase over their 1977 employment of 2,154.[75]

Total construction receipts rose 172% from $61,439,000 for 1977 to $167,130,000 for 1982. Net receipts were $154,467,000 for 1982. Value added increased 217% from $34,107,000 for 1977 to $108,045,000 for 1982.[76]

GLASS AND GLAZING WORK

These contractors (S.I.C. 1793) are engaged in glass and glazing work in connection with, but not limited to, building construction.

Their 1982 employment was 2,218, a 70.4% increase over their 1977 employment of 1,302.[77]

Total construction receipts rose 195% from $46,253,000 for 1977 to $136,343,000 for 1982. Net receipts were $133,911,000 for 1982. Value added increased 183% from $23,453,000 for 1977 to $66,349,000 for 1982.[78]

EXCAVATING AND FOUNDATION WORK

These contractors (S.I.C. 1794) are engaged in

excavation work, foundation work, and digging and loading, in connection with building, heavy, or engineering construction.

Their 1982 employment was 5,830, a 118% increase over their 1977 employment of 2,678.[79]

Total construction receipts rose 260% from $97,381,000 for 1977 to $350,766,000 for 1982. Net receipts were $313,108,000 for 1982. Value added increased 231% from $69,392,000 for 1977 to $229,772,000 for 1982.[80]

WRECKING AND DEMOLITION WORK

These contractors (S.I.C. 1795) are engaged in the wrecking and demolition of buildings and other structures, with or without the sale of material derived from demolishing operations.

Their 1982 employment was 179, a 21.0% increase over their 1977 employment of 148.[81]

Total construction receipts rose 66.1% from $3,977,000 for 1977 to $6,607,000 for 1982. Net receipts were $6,389,000 for 1982. Value added increased 49.5% from $3,762,000 for 1977 to $5,625,000 for 1982.[82]

INSTALLATION OR ERECTION OF BUILDING EQUIPMENT

These contractors (S.I.C. 1796) are engaged in the installation of building equipment, not elsewhere classified, such as elevators, escalators, pneumatic tube

systems, and dust collection equipment.

Their 1982 employment was 2,558, a 210% increase over their 1977 employment of 824.[83]

Total construction receipts rose 280% from $44,754,000 for 1977 to $169,995,000 for 1982. Net receipts were $167,118,000 for 1982. Value added increased 251% from $32,480,000 for 1977 to $113,941,000 for 1982.[84]

SPECIAL TRADE CONTRACTORS, N.E.C.

These contractors (S.I.C. 1799) are engaged in construction work that could not be classified in another specific industry, including such construction work as core and diamond drilling, scaffolding construction, house moving, fireproofing and waterproofing of buildings and other structures, sandblasting and steam cleaning of building exteriors, and other construction activities.

Their 1982 employment was 9,288, a 22.6% increase over their 1977 employment of 7,579.[85]

Total construction receipts rose 76.0% from $259,366,000 for 1977 to $456,541,000 for 1982. Net receipts were $405,330,000 for 1982. Value added increased 75.7% from $137,717,000 for 1977 to $241,938,000 for 1982.[86]

U.S. Census data for Florida in all categories presented above is summarized in Table 3-6.

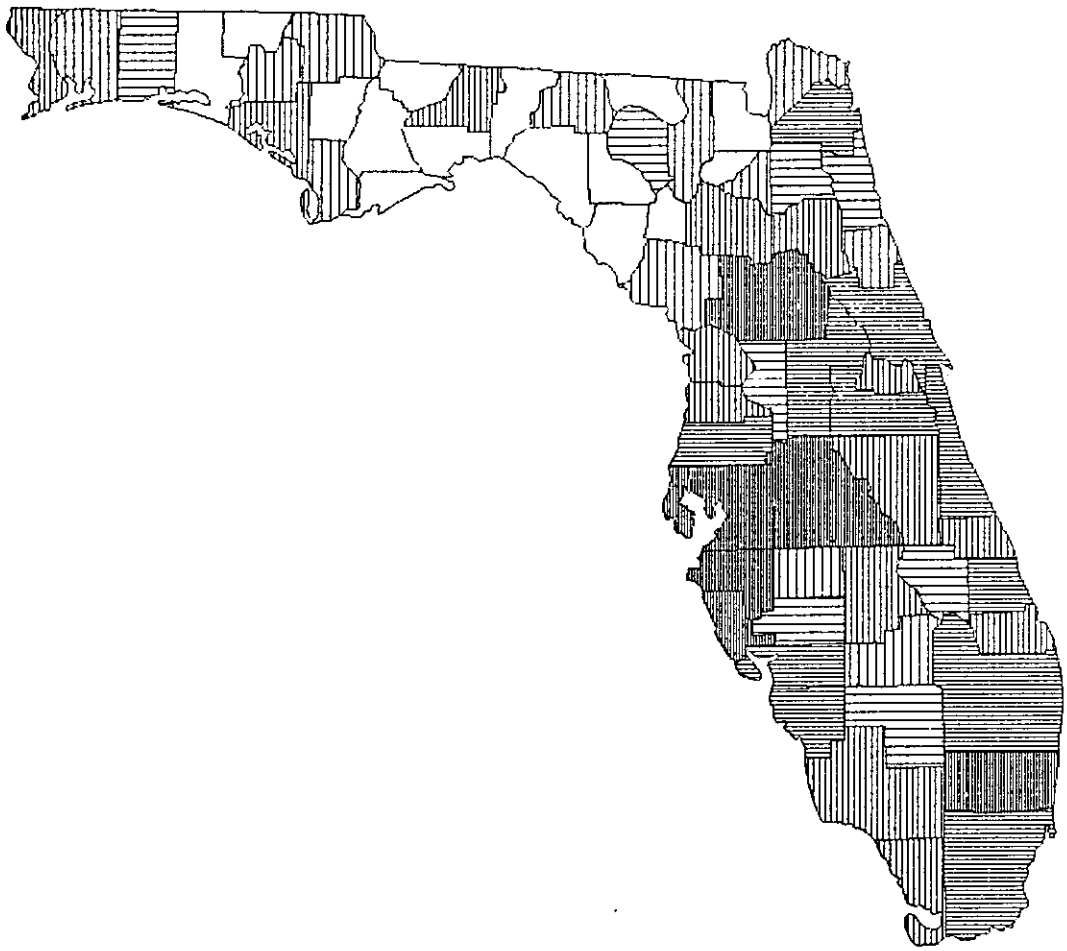
XIII. PREFABRICATED WOOD PRODUCTS & MOBILE HOMES

As home prices continue to increase more and more people turn to mobile homes as an alternative to on site constructed single family homes. The demand for mobile homes comes in the lower price range of housing as evident from the fact that "Mobile homes comprise 89% of all new single family homes sold for under $40,000 in 1981" and only "...account for 36% of all new single family homes sold in 1981 (national average".[87]

For the years 1979-1981 more mobile homes were shipped to Florida than were produced here. In 1979 shipments were 30,103 and production was only 24,360. In 1980 shipments were 27,788 and production only 20,938. For 1981 shipments were 26,174 and production 19,907.[88] These figures also indicate the effect of the recession on the mobile home sector of the economy.

Map 3-7 shows the distribution of mobile home motor vehicle licenses sold for the fiscal year 1982-83. Pinellas county led with 63,430 licenses, followed by Polk with 31,057, Manatee with 30,705, Hillsborough with 28,732, Broward with 27,335, Sarasota with 23,488, and Marion county with 20,157.[90]

MOBILE HOMES [89]



MAP 3-7.

TABLE 3-1 BUILDING PERMITS 1983
IN $MILLIONS [3]

TYPE	$$	PERCENT
HOUSEKEEPING RESIDENTIAL	7033	57.46
NONHOUSEKEEPING RESIDENTIAL	320	2.62
NON RESIDENTIAL	3078	25.15
ADDITIONS AND ALTERATIONS	1477	12.07
PUBLIC	331	2.70

TABLE 3-2 CONSTRUCTION CONTRACTS
1982 IN $MILLIONS[4]

TYPE	$$	PERCENT
RESIDENTIAL	5107	47.21
NONRESIDENTIAL	3745	34.62
OTHER	1966	18.17

TABLE 3-3 HOUSING LOANS & STARTS, CALENDAR YEAR TOTAL; WITH YEAR TO YEAR % CHANGE [22]

	SINGLE FAMILY				MULTI-FAMILY			
	LOANS(1)		STARTS(2)		LOANS(1)		STARTS(2)	
YEAR	($MIL)	% CHG	(EA.)	% CHG	($MIL)	% CHG	(EA.)	% CHG
1970			44818				70139	
1971			62707	39.91			86784	23.73
1972			78145	24.62			171191	97.26
1973	345		64300	-17.72	105		203732	19.01
1974	210	-39.33	42335	-34.16	49	-53.16	89457	-56.09
1975	189	-10.04	34839	-17.71	28	-42.46	17548	-80.38
1976	297	57.65	58989	69.32	30	7.18	35897	104.56
1977	505	70.09	77737	31.78	59	94.75	47291	31.74
1978	711	40.65	90422	16.32	69	16.47	60519	27.97
1979	791	11.31	94946	5.00	113	64.22	70170	15.95
1980	713	-9.94	87219	-8.14	125	10.48	75464	7.54
1981	520	-27.09	66195	-24.10	97	-22.05	71689	-5.00
1982	307	-40.88	56598	-14.50	71	-27.37	43699	-39.04
1983			99024	74.96			68875	57.61

TABLE 3-4 HOUSING AFFORDABILITY INDEX [26]

YEAR	AVERAGE MORTGAGE INT.RATE	MORTGAGE QUALIFY INCOME	MEDIAN FAMILY INCOME	HOUSING AFFORD INDEX
1978	9.58	15834	17640	111.4
1979	10.92	20240	19680	97.2
1980	12.95	26328	21023	79.9
1981	15.12	32485	22388	68.9
1982	15.38	33713	23433	69.5
1983	12.85	29546	24700	83.6

Table 3-5 Contractor License Distribution - By County; July 1984 46

CNTY.	CG	RG	CB	RB	CR	RR	CU	CH	CA	CF	CS	RA	RF	RM	RS	ER	EC	CC	RC
DADE	1540	226	150	138	83	90	8	53		118	7		202	82	29	255	62	64	190
DUVAL	349	306	171	195	154	52	11	21	1	46	1	1	83	73	19	124	44	16	167
HILLS	522	114	237	112	165	142		30		88	6	1	85	95	15	235	26	42	126
PINEL	562	100	268	177	192	223	6	13	1	47	5	2	171	68	14	156	23	38	150
POLK	176	128	51	123	27	280	2	14		14	1		105	12	13	137	6	14	93
P.BCH	1370	178	264	95	209	78	8	10	1	63	4	2	139	10	16	201	16	46	73
ORANG	453	136	190	82	149	263	4	16		24	1	2	128	49	7	172	12	33	97
VOLUS	222	96	136	41	186	119	2	4		15	1	1	93	49	7	96	5	11	59
ESCAM	48	436	11	167	14	105				8		1	84	56	8	75	3	2	59
BROWA	1478	364	229	65	142	37	10	26	2	104	6	2	221	45	16	339	41	95	177
ALACH	130	170	68	57	58	30				4	1		44	25	12	50	8		72
LAKE	60	27	31	66	20	123	1	3		5			51	8	3	58			43
LEON	72	187	47	134	31	102	5	3		5		4	39	24	15	39	2	3	50
MARIO	66	209	50	98	44	124		1		1			86	46	3	89	2	4	41
MANAT	92	30	78	38	44	103	1	3		7			63	11	2	65		7	45
SARAS	269	88	149	115	107	242		4		13			113	8	6	96	3	16	60
SEMIN	209	48	100	51	107	114		5		11		1	59	13	6	57	4	14	42
LEE	424	114	160	65	153	101	6	8		42			102	15	5	110	7	53	45
BREVA	264	159	95	58	82	132	4	3		5		1	87	17	7	91	4	16	88
ST.JO	31	44	8	59	15	32		1					23	10	6	54		2	18
GADSD	7	13	4	20	1	4							11	7	2	22	1		2
PUTNA	16	17	3	22	3	35				3			32	5	1	37		4	12
BAY	30	136	5	179		139				4			81	38	10	87	2	2	33
ST.LU	112	20	62	24	58	80		1		5		1	27	3	1	42	2	3	16
JACKS	2	26	2	34	2	22				1			29	10	2	44			7
OSCEO	36	23	25	36	12	48		1		2			19	4	1	27		2	14
HIGHL	32	26	29	28	16	70				3		1	43	12	3	50		1	18
PASCO	82	39	92	69	68	106	1			6		1	108	14	3	94	3	8	39
COLUM	11	38	8	27	6	4		1				1	16	1	1	23		1	21
HARDE	1	11	3	14	1	2				2			7	2	1	14			10
SUWAN	4	6	4	13	1	20				1			15	4		25		1	1
I.RIV	115	53	34	25	44	49				8			47	11	2	85	3	4	22
SAN.R	10	337	2	51	5	28						1	49	23	1	29		1	18
DESOT	5	3	9	4		8							12	6		14		3	10
MADIS	3	8		7	1	8							4	2		14			
WALTO		60		16	1	8							7	11		16			5
TAYLO	2	2		12									3	1	1	5			4
MONRO	81	47	24	23	11	41				6		1	35	11	3	33	2	1	9
LEVY	10	16	2	13	3	9				1		1	18	7	1	34			4
HERNA	26	17	33	27	25	72							21	3	2	36		1	15
NASSA	11	19	6	11	3	20				1			16	3		32			4
MARTI	206	37	64	15	66	20	2	1		13			22	4	2	23	1	5	8
OKALU	20	522	4	94	11	43		2		3		1	56	78		57	5		25
SUMTE		6	5	20	8	18				1			22	4	1	25		1	9
BRADF	4	10	2	13	2	5		1		1		1	8	4		17		1	2
JEFFE		6	1	6	1	10							3	3	2	5		1	2
CITRU	29	28	14	42	15	78					1	2	40	8	6	42	2		9
CLAY	49	31	30	36	29	19	1			4			9	3		37	3	1	8
HENDR	11	8	3	3	1	7							9	14	1	14			9
WASHI	4	32		10		8							9	1		9		1	4
HOLME		10		11		13							2	3		7			1
BAKER	3	6	1	3		4				1			5	2		11			
CHARL	71	13	36	26	43	86			1	7			20	2		18	2	9	23
DIXIE		3		9		5				1			1	2		4			1
GILCH		4	3	6	1	10							8			5			2
HAMIL		1		7	1	1							6	1		4			4
OKEEC	7	11	9	13	3	14				1			10	2	2	11	2	2	5
CALHO	1	4		9	1	6							4	2		7			5
FRANK	1	12		7	1	3							2		1	2			
GLADE	1	2			1								1			2			3
FLAGL	7	51	5	9	11	11							13	1		17			5
LAFAY	1	1		6		3										1			
UNION		8	2	1	1	1				1			3			7			
COLLI	194	59	62	59	43	64		2		8		1	74	18	3	68	2	5	31
WAKUL	4	7		8	2	5							2			2			1
GULF		10		21		6						1	16	4		15			3
LIBER	1	1		3		2							1	2		1			1
TOTAL	9547	4960	3081	3028	2484	3707	72	227	6	704	34	31	2924	1052	262	3673	298	534	2120

TABLE 3-6 SUMMARY OF 1982 PRELIMINARY CENSUS DATA

SEGMENT	EMPLOYMENT	$$ TOTAL RECEIPTS	$$ VALUE ADDED	$$ NET RECEIPTS
GEN.CONT./SF	25,883	1,914,198,000	720,684,000	1,350,152,000
OPERATIVE BLDR.	14,121	2,006,384,000	741,084,000	1,084,452,000
RESIDENT./OSF	7,842	1,056,985,000	265,915,000	464,321,000
N.RES/O IND.WH	18,717	2,139,400,000	551,937,000	969,278,000
IND. & W/HOUSE	5,036	505,501,000	124,992,000	248,643,000
B,T,ELEV.HWAY	1,675	126,812,000	70,192,000	107,300,000
W,S,PIPE/L,C,PL	10,438	601,282,000	315,716,000	505,800,000
HEAVY CONS/CONT	9,023	692,565,000	409,563,000	589,695,000
H/WAY & STREET	9,972	738,523,000	345,239,000	576,549,000
P,H, AIR/COND.	33,728	1,824,754,000	920,239,000	1,699,412,000
ELECTRICAL	26,380	1,277,914,000	707,700,000	1,251,103,000
ROOFING & SM	14,962	653,299,000	348,822,000	624,872,000
MAS., S/SETTING	7,217	206,042,000	121,352,000	194,425,000
P,D/WALL,ACC/IN	15,236	590,013,000	341,024,000	553,519,000
TER.,TILE,M & M	2,453	100,421,000	52,798,000	97,056,000
CONCRETE WORK	10,833	567,171,000	316,316,000	504,771,000
P,P/HANG./DEC.	8,932	255,052,000	167,294,000	230,231,000
CARPENTERING	7,885	252,429,000	135,401,000	224,973,000
F/LAY, OF/WORK	1,252	51,725,000	24,212,000	47,835,000
WATER WELL DR.	1,047	57,461,000	30,970,000	55,751,000
STR. STEEL ER.	3,581	167,130,000	108,045,000	154,467,000
GLASS/GLAZING	2,218	136,343,000	66,772,000	133,911,000
EXC. &FOUND.W	5,830	350,766,000	229,772,000	313,108,000
WRECK & DEMO.	179	6,607,000	5,625,000	6,389,000
INST/EREC. B&E	2,558	169,995,000	113,941,000	167,118,000
SP/TR/CONT/NEC	9,288	456,541,000	241,938,000	405,330,000

SPECIFIC SOURCES ARE LISTED IN THE TEXT

Notes to Chapter 3

1. U.S. Department of Commerce, Bureau of the Census (hereafter cited as U.S. Census), 1982 Census of Construction Industries Preliminary Reports (Washington, D.C.: Government Printing Office 1983-1984).

2. U.S. Department of Labor, Employment and Earnings (Washington, D.C.: Government Printing Office, 1983).

3. Bureau of Economic and Business Research (BEBR), Building Permit Activity in Florida (Gainesville: Northeast Regional Data Center, University of Florida, 1984), XXIX (13):1.

4. Florida Division of Economic Development, State Data Base Computer Files (Tallahassee: Florida State University, 1983), code 2001-2003.

5. U.S. Census, 1982 Census of Construction Industries Preliminary Report Summary Series (Washington, D.C.: Government Printing Office, 1984), 1.

6. Ibid., 2-3.

7. Ibid.

8. Ibid., 2.

9. Ibid, 2-3.

10. Walter Schmidt, R. Hoenstine, M. Knapp, E. Lane, G. Ogden, T. Scott, The Limestone, Dolomite and Coquina Resources of Florida (Tallahassee: Florida Department of Natural Resources, Bureau of Geology Report of Investigation 88, 1979), 1-2.

11. Ibid., 12,17.

12. Florida Department of Environmental Regulation, Water Quality and Mining, An element of the State Water Quality Management Plan (Tallahassee: Florida Department of Environmental Regulation, 1980), A 25-26.

13. William Tanner, ed., Eleventh Annual Symposium on Highway Engineering Geology Proceedings (Tallahassee: Florida Geological Survey, 1960), 7.

14. Schmidt, Limestone, Dolomite, Coquina, 17.

15. Frances W. Terhune, ed., 1983 Florida Statistical Abstract, Gainesville: University Presses of Florida, 1983), 331.

16. Ibid.

17. Ibid., 633.

18. U.S. Department of Commerce, Bureau of Census, 1982 Census of Construction Industries Preliminary Report Industry Series (hereafter cited as 1982 Census Preliminary Report), General Contractors--Single Family Houses (Washington, D.C.: Government Printing Office, 1984), 2-3.

19. Ibid.

20. 1982 Census Preliminary Report, Operative Builders, 2-3.

21. Ibid.

22. Bureau of Economic and Business Research (BEBR), The BEBR Computerized Data Base (Gainesville: Northeast Regional Data Center, University of Florida, (1982), Files SGNS and HSNS.

23. Ibid., File SGNS.

24. Ibid., File HSNS.

25. Ibid., Files SGNS and HSNS.

26. Marjorie Leedy, "Housing Affordability Index Declines Slightly in May", Realtor News, 5 (21) (July 2, 1984): 4.

27. Florida Association of Homebuilders, Media Facts.

28. Ibid.

29. Construction Industry Licensing Board, Computer File of Contractors (Tallahassee: Florida State University Computing Center), Volume 10128.

30. Jack Snyder, "5 Florida Areas Lead in Housing", The Orlando Sentinel (April 30, 1984): e1.

31. 1982 Census Preliminary Report, General Contractors -

Residential Buildings, Other than Single Family Houses, 2-3.

32. Ibid.

33. BEBR, Computerized Data Base, File S7NS.

34. Ibid., File MSNS.

35. Ibid., Files S7NS and MSNS.

36. 1982 Census Preliminary Report, General Contractors -Nonresidential Building, Other Than Industrial Buildings and Warehouses, 2-3.

37. Ibid.

38. 1982 Census Preliminary Report, General Contractors - Industrial Buildings and Warehouses, 2-3.

39. Ibid.

40. Construction Industry Licensing Board, File of Contractors.

41. 1982 Census Preliminary Report, Bridge, Tunnel and Elevated Highway Construction Contractors, 2-3.

42. Ibid.

43. 1982 Census Preliminary Report, Water, Sewer, Pipe Line, Communication and Power Line Construction Contractors, 2-3.

44. Ibid.

45. 1982 Census Preliminary Report, Heavy Construction Contractors, N.E.C., 2-3.

46. Ibid.

47. Construction Industry Licensing Board, File of Contractors.

48. 1982 Census Preliminary Report, Highway and Street Construction Contractors, 2-3.

49. Ibid.

50. 1982 Census Preliminary Report, Plumbing, Heating (except electric), and Air Conditioning Special Trade

Contractors, 2-3.

51. Ibid.

52. Construction Industry Licensing Board, File of Contractors.

53. 1982 Census Preliminary Report, Electrical Work Special Trade Contractors, 2-3.

54. Ibid.

55. Construction Industry Licensing Board, File of Contractors.

56. 1982 Census Preliminary Report, Roofing and Sheet Metal Work Special Trade Contractors, 2-3.

57. Ibid.

58. Construction Industry Licensing Board, File of Contractors.

59. 1982 Census Preliminary Report, Masonry, Stone Setting, and Other Stonework Special Trade Contractors, 2-3.

60. Ibid.

61. 1982 Census Preliminary Report, Plastering, Drywall, Acoustical and Insulation Work Special Trade Contractors, 2-3.

62. Ibid.

63. 1982 Census Preliminary Report, Terrazzo, Tile, Marble, and Mosaic Work Special Trade Contractors, 2-3.

64. Ibid.

65. 1982 Census Preliminary Report, Concrete Work Special Trade Contractors, 2-3.

66. Ibid.

67. 1982 Census Preliminary Report, Painting, Paper Hanging and Decorating Special Trade Contractors, 2-3.

68. Ibid.

69. 1982 Census Preliminary Report, Carpentering Special Trade Contractors, 2-3.

70. Ibid.

71. 1982 Census Preliminary Report, Floor Laying and Other Floorwork Special Trade Contractors, N.E.C., 2-3.

72. Ibid.

73. 1982 Census Preliminary Report, Water Well Drilling Special Trade Contractors, 2-3.

74. Ibid.

75. 1982 Census Preliminary Report, Structural Steel Erection, Special Trade Contractors, 2-3.

76. Ibid.

77. 1982 Census Preliminary Report, Glass and Glazing Work Special Trade Contractors, 2-3.

78. Ibid.

79. 1982 Census Preliminary Report, Excavating and Foundation Work Special Trade Contractors, 2-3.

80. Ibid.

81. 1982 Census Preliminary Report, Wrecking and Demolition Work Special Trade Contractors, 2-3.

82. Ibid.

83. 1982 Census Preliminary Report, Installation or Erection of Building Equipment Special Trade Contractors, N.E.C., 2-3.

84. Ibid.

85. 1982 Census Preliminary Report, Special Trade Contractors, N.E.C., 2-3.

86. Ibid.

87. Florida Manufactured Housing Association, Media Fact Sheet, (Tallahassee: Florida Manufactured Housing Association, n.d.), 1.

88. National Conference of States on Building Codes and

Standards, Mobile Home Program Statistics, 14 (1982): 3; ibid. 11 (1980): 1-2; ibid. 13 (1981): 1-4.

89. Construction Industry Licensing Board, File of Contractors.

90. The Florida Chamber, Economic Profile of Florida Counties, (Tallahassee: Florida Chamber of Commerce, 1983). 3.

CHAPTER 4

SHOWING ECONOMIC IMPACT THROUGH INPUT-OUTPUT ANALYSIS

I. ECONOMIC IMPACTS

Before the input-output model can be understood, it is important to realize how one industry or sector can stimulate total economic activity throughout other sectors. These impacts can be divided into four categories: direct, indirect, induced, and total impacts.

First, direct impacts are those associated with the actual production of a product. Within the construction industry, direct impacts would include wages and jobs to management and labor. As a result of the direct impacts, additional economic activity is created throughout the other sectors in the way of goods and services provided by local businesses or individuals to the basic industry. Basic in this sense represents the industry actually providing the final product. This indirect impact is represented within the construction industry by subcontractors, material suppliers, consultants and business services. An increase in indirect impact will result in additional jobs and income for state residents.

Both direct and indirect impacts can cause additional activity within the economy called induced impacts. This type of activity is associated with the spending of the

individuals employed by the direct and indirect businesses. This personal spending results in increased sales by retail organizations, savings and checking accounts, and all other services purchased by the consumer.

The total impact of an industry on the economy can be represented by the summation of direct, indirect, and induced impacts. This impact may be represented by a series of events stemming from the basic industry and continuing throughout the economy.

II. The Spending Chain Reaction

A spending chain reaction results from an increase in output of a given industry. This increase in output results in additional local output and purchases as suppliers expand to meet the needs of the first industry. Consumer spending also increases as output of both the service and supply industries expand.

Capital within the chain reaction is not completely retained. Money leaks out of the state economy in areas such as payments for imports, federal taxes, savings, and dividends paid outside the region.

A measurement of this economic spending is designated the "multiplier effect". This effect represents the total respending which results from a one dollar increase in output of a service or basic industry. This would indicate

an industry with a high multiplier heavily impacts the economy as a whole.

The multiplier effect can also detect a decrease in basic industry output. This type of change would stimulate a decrease in spending and economic activity associated with the basic industry. The multiplier can be used as a tool to determine economic ties and dependencies of sectors upon other sectors and the economy as a whole.

III. CONSTRUCTING AN INPUT-OUTPUT MODEL

Input-output analysis is a technique used to show the economic interrelationships between industries.[1] This method provides a straight forward description of an economic function in a particular year showing the flow of goods and services among all the sectors as well as those outside the designated area. This means that for each sector or industry, the sum of all outputs sold to other sectors must equal the sum of all inputs. To show the relationship among sectors, a matrix is used with producers of outputs down the left hand side and purchasers of inputs across the top. A simplified illustration of an input-output model is shown in Figure 4-1.

Figure 4-1 Basic Format of the Input-Output Model

	PURCHASING INDUSTRIES WITHIN THE ECONOMY	FINAL DEMAND
PRODUCING OR SELLING INDUSTRIES		
CHARGES AGAINST FINAL DEMAND		

Each sector or industry in the table is listed twice, once across the top as a purchaser of goods and services and again at the left of the table as a seller of goods and services. The final demand column represents the sales to a final consumer. When dealing with construction, the final demand column will represent new construction. The charges against final demand are payments for taxes, imports, and so forth.[2]

Input-output analysis involves three phases - transactions, coefficients, and total requirements - and a

matrix table is constructed for each. It is from these that a multiplier or impact analysis can be made.

TRANSACTION TABLE

The first phase of input-output analysis, the transaction table, shows the flow of goods and services as a dollar value within an economy over a period of one year. Transactions are expressed in terms of producer prices.[3]

With the transaction matrix, a dollar figure is placed in each cell to represent the total output sold during the year by the industry on the left to the industry at the top. Households are treated as a separate industry, selling labor and purchasing goods and services.[4] For example, in Figure 4-2, the horizontal row of industry A sold $2 million to itself (e.g., a building supply company will buy building supplies for its own repair construction), $7 million to industry B, $16 million to industry C, $12 million to the household industry, and $11 million to final demand for a grand total output in sales of $48 million.

Figure 4-2

Simplified Input-output Transaction Matrix

	A	B	C	HH	FINAL DEMAND	TOTAL SALES
A	2	7	16	12	11	48
B	5	14	12	9	4	44
C	4	11	8	3	15	41
HH	17	6	3	9	20	55
VALUE ADDED	20	6	2	22		
TOTAL PURCHASES	48	44	41	55		

Since, within the transaction matrix, sales by one industry equal the purchases by other industries, each column in a transaction table shows the total inputs purchased by each industry listed at the top from all the sellers named at the left. The value added row below the transaction matrix represents the dollar value of profit, interest, depreciation, and taxes contributed by the industries at the top of the table. Using industry A again, the first column shows that in order for industry A to meet its production needs, it must purchase $2 million from

itself, $5 million from industry B, $4 million from industry C, $17 million from households (labor), and $20 million in profit, interest, depreciation and taxes. The total transactions of the economy for a one year period are represented by the rows and columns of the transaction matrix.

TECHNICAL COEFFICIENTS

The second phase of the input-output analysis is the calculation of technical coefficients for each cell for the transaction table. This is accomplished by dividing the inputs of each industry by the total output for that industry. For example, in Figure 4-3, the technical coefficients for industry A would be 0.04, 0.10, 0.08, 0.35. They were determined by dividing each of the values in Column A of Figure 4-2 (2, 5, 4, and 17) by the total output in Row A of 48.

Figure 4-3
Technical Coefficients Matrix

	A	B	C	HH
A	.04	.16	.39	.22
B	.10	.32	.29	.16
C	.08	.25	.20	.05
HH	.35	.14	.07	.16

Each technical coefficient signifies the amount of input required from the industry named at the left for each dollar of output produced by the industry at the top of the technical coefficients table. For example, each dollar of output by industry A requires 4 cents of purchases from itself, 10 cents from B, 8 cents from C, and 35 cents from households. The complete table of technical coefficients reflects the technical composition of production in the economy in terms of inputs required in the production and trade processes. These technical coefficients can be used to calculate the amount of direct purchase requirements as a result of an increase or decrease in the output of one or more of the purchasing industries.

TOTAL REQUIREMENTS

The third and final phase in this analysis involves constructing a table of total requirements. From this table, we are able to obtain multipliers for computing the total impact of any sector in this economy. The table of technical coefficients provides the starting point for the total requirements table. Each column in the technical coefficients table is a linear equation which is the production function for the industry in that particular column. That is, it shows the input requirements for

expanding the output by one unit. Therefore, mathematically all of the equations can be solved to obtain the output level necessary for each row industry or seller to meet its final demand sales plus its intermediate sales to other industries.

IV. MULTIPLIERS

One of the most important qualities of an input-output model is its ability to generate multipliers. Multipliers are attained through the development of the interdependence coefficients in the total requirements table. It is from this that the output, employment, and income multipliers can be derived.

As stated earlier, multipliers are generally used to trace the effects of changes in final demand through the economy. They measure the direct, indirect, and induced effects of particular economic changes. Multipliers can be used to measure the ripple effect of a change in final demand of a particular industry on the whole economy or on the individual industries which are related to it.[5] The sectoral multipliers differ substantially from one industry to the next depending on the degree of interdependence with the other industries. Industries with large output multipliers have a larger percentage of the required inputs coming from within the local economy.

Once the matrices of interdependence and direct technical coefficients are completed, the data required for calculation of output, income, and employment multipliers are available. All three multipliers measure repercussions in the local economy due to changes in output. Because they differ in concept, each multiplier will be discussed separately.

OUTPUT MULTIPLIERS

The output multipliers for an industry measure the sum of the direct and indirect requirements from all industries due to a dollar change in the given industry's final demand. The total requirements table shows the required output from each industry when final demand changes by one dollar in a given row. The sum of the coefficients in that industry's column equals the industry's output multiplier. For example, a dollar increase in an industry's final demand which has an output multiplier of $4.66 would generate an additional $3.66 worth of economic activity. The $4.66 includes the $1.00 of new final demand along with the $3.66 worth of additional economic activity. [6]

INCOME MULTIPLIERS

Input-output models allow the calculation of two types of income multipliers. In the first type, income multipliers can be calculated with the household industry

excluded from the transaction matrix (type I multipliers). The second type of income multipliers includes the household industry as a part of the transaction matrix (Type II multipliers).[7] The type II income multipliers, which will be used in this case, are calculated from the input-output table which includes households as a separate industry in the transaction matrix. Households are like any other industry, purchasing inputs (consumption) and selling outputs (labor) to all of the other industries. This allows the model to capture economic impacts (induced impacts) associated with the spending activity of consumers.

Calculating income multipliers is done by dividing each element in the household row of the total requirements table by the corresponding element in the household row of the technical coefficients matrix. This allows the industry's income multiplier to be calculated by dividing the direct, indirect, and induced changes in income per dollar change in sector output by only the direct effects on income due to a dollar change in output.

Income multipliers actually reflect the impact of change in income and should be interpreted with caution when dealing with their changes in output.[8] For example, if there is a high direct payment with only a small increase to include indirect and induced payments, then the income multiplier is low. On the other hand, if there is an industry whose direct, indirect, and induced payments are

much larger than the direct payment, then the income multiplier will be high. This high income multiplier indicates that there are strong structural ties with other local industries.

EMPLOYMENT MULTIPLIERS

The employment multiplier for an industry estimates the effects on employment of a change in final demand for that industry's output.[9] Similar to the income multipliers, there are direct, indirect, and induced employment changes when the final demand for an industry's output changes. Direct employment changes result as an industry makes production adjustments to meet the needs of final demand. Indirect employment changes occur when each industry makes output adjustments to support the change in deliveries to final demand. Induced employment changes occur when the economy responds to the change in local household spending.

Calculating employment multipliers can be accomplished with the input-output table using an industry's employment and dividing it by the total gross output of that industry.[10] The result of this calculation is a direct employment ratio which indicates the employment directly required per dollar change in final demand.

The total effect on employment of a change in final demand is the sum of the direct, indirect, and induced employment effects. In order for the total effect to be

estimated, each row in the table of technical coefficients is multiplied by the direct employment ratio for each corresponding industry. The sum of the values in each column equal the industry's employment multiplier. For example, an employment multiplier of 0.00028 indicates that when final demand increases by $100,000.00, that industry will generate employment for twenty-eight people within the state economy.

V. DEVELOPMENT OF THE CONSTRUCTION BASED I-O MODEL

This sections begins the development of the construction based input-output model for Florida. The purpose of this section is to present a description of the specific input data, procedures, and assumptions utilized to formulate the construction based input-output model for Florida. The input-output model used for this analysis was developed by the Institute of Food and Agriculture Sciences' (IFAS) Food and Resource Economics Department at the University of Florida.[11]

DETERMINATION OF SECTORS

The first step in the process of developing the input-output model is the divisions of the economy into sectors or industries. The object of this step is to group together those firms which produce similar products.

Because there is a high level of disaggregation in industrial classifications, a standard will be needed to maintain some uniformity within the state. The popular classification system is the Standard Industrial Classification (S.I.C.) system developed by the United States Office of Management and Budget to standardize data collection systems within the federal system.[12]

The IFAS input-output matrix was used as a basis for the study. This model contains 52 separate economic sectors and was estimated for 1980. These sectors were condensed from the 1972 input-output model which contained 86 economic sectors. Most of the 86 sectors were direct Standard Industrial Classification (S.I.C.) code number industries. From the 52 sector IFAS model, alterations were made to expand the single line entry of Construction into the many different subdivisions dealing with construction. Also, other sectors were combined which seemed to have similar input and output structure (buying and selling characteristics). With the final revision, 43 sectors remained to form the construction based input-output matrix for Florida. A list of the economic sectors for the Florida model, along with their S.I.C. numbers appear in Figure 4-4. Households or consumers were treated as a separate sector, buying goods and services and selling labor. However, it does not have a S.I.C. code number to be used in the table.

REQUIRED DATA FOR THE I-O MODEL

This subsection will look at the data that must be entered into the model in order to generate the analysis. The data being entered were originally collected for the IFAS model. These numbers have been updated for this model using the following abstracts.

U.S. Bureau of the Census, Statistical Abstract for the United States 1982-83, 103rd Ed. Washington D.C.

Bureau of Economic and Business Research, 1983 Florida Statistical Abstract, College of Business Administration, The University of Florida, Gainesville, 1983

U.S. Bureau of the Census, 1982 Census of Construction Industries, U.S. Department of Commerce, Washington D.C.

NATIONAL EMPLOYMENT AND OUTPUT TOTALS

The data for employment are estimates of full-time equivalent employees rather than the actual number of people employed. This is necessary to account for seasonal and part-time employment. Employment for Households is an artificial number designed to yield the location quotient, a factor used in adjusting national and state economics, greater than unity. The output estimates are measured as the value of sales expressed in dollars at producers' prices. The only exception to this is households, where output is based on a measure of total personal income.

Figure 4-4
Florida Sectors with Standard Industrial Classification Codes

FLORIDA SECTOR NUMBER	SECTOR	SIC NUMBER
1	Agriculture	7
2	Forestry & Fishery Industry	8,9
3	Mining	10,11,12,13,14
4	Residential Building Construction	152
5	Single Family Housing Construction	1521
6	Non-residential Building Construction	154
7	Industrial & Warehouse Construction	1541
8	Heavy Construction	16
9	Highways & Street Construction	161
10	Plumbing, Heating & A/C	171
11	Specialty Trades & Finishwork	17,172,175,178,179
12	Electrical Work	173
13	Masonry, Stonework & Plastering	174
14	Roofing & Sheet Metal Work	176
15	Concrete Work	177
16	Prefab & Mobile Homes	245
17	Food & Kindred Products	20,21
18	Textiles & Apparel	22,23
19	Lumber & Wood Products	24
20	Furniture & Fixtures	25
21	Paper Products	26
22	Printing & Publishing	27
23	Chemical Products	28,29
24	Rubber, Leather & Plastic Products	30,31
25	Glass, Stone & Clay Products	32
26	Primary Metal Industries	33
27	Fabricated Metal Industries	34
28	Equipment & Machinery (non-trans)	35,36
29	Transportational Equipment	37
30	Instruments & Related Products	38,39
31	Transportation & Warehousing	40,41,42,43,44,45,46,47
32	Communications	48
33	Utilities	49
34	Wholesale & Retail Trade	50,51,52,53,54,55,56,57,58,59
35	Finance & Insurance	60,61,62,63,64,65
36	Real Estate & Rentals	66,67
37	Hotels & Restaurants	70,72
38	Auto Repair Service	75,76
39	Professional & Business Services	73,81,83 84,86, 89
40	Movies & Amusements	78,79
41	Medical Services	80
42	Government Enterprise	82
43	Households	

STATE EMPLOYMENT

Here again, State employment is based on full-time equivalents to account for seasonal and part-time employment. Household employment is set equal to the State's total personal income. In the input-output model printout, the value for households has been adjusted to 100 to direct the program in such a fashion as to show all labor as being created from within the State. Output for the State is calculated internally in the program assuming that the output per employee is the same at the state level as it is at the national level.

NATIONAL TRANSACTION MATRIX

The national transaction matrix is based on data from the 1976 input-output model.[13] The values listed in this model reflect the sales and purchases from the base year of 1976. This was the last year the input-output model was updated. Updating the model for 1982 is performed by the inclusion of the values in the previous sections in this chapter.

1976 NATIONAL OUTPUT

The 1976 national output is used in this model as the base year for updating the model to any given year. These data are broken down by the same sectors used for the 1982 model.

RATIOS

The last set of data to be entered into the program are the ratios. These ratios help each sector compensate for the different products produced. The closer each ratio is to one, the more similar the products are in each sector.[14] The ratios for each of the sectors appear in the output next to the attributable commodity output (ACO) after the row and column sums in the national transaction matrix.

STATE OUTPUT

State output is not inputed into the computer program. However, it is produced in the computer output. Total State output is calculated by the program by multiplying State employment by national output/worker figures. The following equation displays the initial process.

$$1982 \text{ State output} = \frac{1982 \text{ Nat. output}}{1982 \text{ Nat. emp.}} \times 1982 \text{ State emp.}$$

It is initially assumed that the productivity or output/worker is constant for both national and state employees for each sector. The resulting State output was then compared with actual State output figures found in the 1982 Census of the Construction Industry. Slight adjustments were then made to the national output/worker to get Florida input/worker figures consistent with the census

data.

LIMITING ASSUMPTIONS OF I-O ANALYSIS

Input-output models provide a wealth of information concerning transactions and interdependencies between the industries within the economy. The models show that every industry is dependent upon all other industries. There are, however, some limitations to the model that must be considered. A brief review of input-output analysis will detail some of the major limiting assumptions.

The first basic assumption deals with the input-output production function in that it has constant technical coefficients to express the requirements per dollar of output from one industry to another. This refers to constant returns to scale, which means that a proportional change in all inputs lead to the same proportional change in outputs. if the inputs were all doubled, then the outputs would also be doubled. Therefore, this rules out economics and diseconomies of scale coming from a large percentage change in size and output. The longer the time period between measurements, the less valid the coefficients become.[15]

The second basic assumption is that the inputs are combined in fixed proportions and substitutions of one input for another is not allowed. Proportions are given by the direct technical coefficients which are assumed to remain

constant despite changes in relative prices and output levels. These fixed input ratios freeze the state of technology for the period of analysis.

Relative to the technical coefficients is the measurement of outputs in terms of dollars. Technical coefficients are not in dollar units or constant dollars. This means that if prices for inputs change disproportionately, then the coefficients would have to be recalculated.[16]

Another assumption is that a commodity is considered to be supplied by only one industry and is the only product of that industry. This does not correspond to reality in that many industries have been aggregated for manageability and, therefore, their products are not necessarily alike. Aggregated industries have similar input structures which assumes a clear delineation of industries and their transactions.

The last, and fourth major assumption is the inability of the input-output analysis to account for changes in supply factors. Since input-output is a demand driven model (inputs required for outputs), it assumes that the supply of inputs such as labor, capital, land, and imports are readily available at the same cost and proposes no constraints on the economy.[17]

The construction based input-output model is quite lengthy and will not be presented in this volume.

Interested parties are referred to Development of a Methodology to use Input-Output Analysis on the Construction Industry in Florida by David Perley.[18] The results of the analysis are summarized in Chapter 5.

Notes to Chapter 4

1. Edna Loehman and Robert Mcelroy, Input-Output Analysis as a Tool for Regional Development Planning, (Gainesville: IFAS University of Florida, 1979); William Miernyk, The Elements of Input-Output Analysis (New York: Random House, 1965); Harry Richardson, Input-Output and Regional Economics (New York: John Wiley & Sons, 1972).

2. F. Chapin and E. Kiser, Urban Land Use Planning (Urbana; University of Illinois Press, 1979), 131-132.

3. Miernyk, Input-Output Analysis, 8-10.

4. Ibid., 12-14.

5. Ibid., 42-43.

6. Richardson, Regional Economics, 32.

7. Ibid., 42.

8. Loehman and Mcelroy, Regional Development Planning.

9. Miernyk, Input-Output Analysis, 53.

10. Richardson, Regional Economics, 34-36.

11. Loehman and Mcelroy, Regional Development Planning.

12. U.S. Department of Commerce, County Business Patterns: Florida (Washington, D.C.: Government Printing Office, 1980) 1-5.

13. Institute of Food and Agriculture Sciences (IFAS), 1976 Florida Input-Output Model (Gainesville: University of Florida, 1979).

14. David Perley, Development of a Methodology to use Input-Output Analysis on the Construction Industry in Florida (Unpublished MBC Thesis, School of Building Construction, University of Florida, 1984), 54.

15. Loehman and Mcelroy, Regional Development Planning, 28.

16. Ibid., 29.

17. Ibid.

18. Perley, Development of Methodology to use Input-Output.

CHAPTER 5.

INPUT-OUTPUT RESULTS

ECONOMIC IMPACT OF THE CONSTRUCTION INDUSTRY

I. INCOME MULTIPLIERS

The multipliers generated by this model seem unrealistically high for some industries. Industries with high multipliers may be the result of aggregating sectors and using prorated data in the construction sectors at the beginning of this study.

The income multiplier for construction, which is 2.60, excludes the Prefab and mobile home industry. This multiplier indicates that a $1.00 increase in direct income to employees in construction will generate an additional $1.60 in local income. This shows that construction has strong structural ties (a high degree of interaction) with the other local sectors in Florida.

II. SALES MULTIPLIERS

The export sales multiplier (output multiplier) for construction shows the total expansionary effect on the economy by increasing final demand. The construction output multiplier of 3.43, indicates that a dollar increase in final demand for construction, would increase the value of

total state output by $3.43, of which an additional $2.43 worth of economic activity is generated within the state. Other sectors with large output multipliers include: Instruments and Related Products, Government, Transportation and Warehousing, Forestry and Fishery, Finance and Insurance, Printing and Publishing, Movies and Amusements, Professional and Business Services, Medical Services, Hotels and Restaurants, and Food and Kindred Products. Figure 5-1 shows the output multipliers for construction, mining, and prefab & mobile homes.

Figure 5-1

Sales Multipliers
Sales Generated From An Additional $1000 In Sector Sales

SECTOR	S.M.	$ TO SECTOR	$ TO OTHER SECTORS
Mining	2.626	1000.00	1626.00
Const. Sectors (4-15)	3.428	1000.00	2428.00
Prefab & Mobile homes	3.263	1000.00	2263.00

III. OUTPUT ATTRIBUTABLE

Output attributable to Florida from the construction industry is over 17% of the 1982 total output.

IV. EMPLOYMENT MULTIPLIERS

The employment multipliers for construction vary from 2.40 to the highest value in the model of 6.24. The interpretation of the employment multipliers are that they can only be used for comparison purposes. The higher the multiplier, the greater the degree of interaction construction has with the other sectors in Florida.

V. EMPLOYMENT ATTRIBUTABLE

Employment attributable to the construction industry is 750,325. This indicates that construction accounted for approximately 18% of the total Florida employment from sales in final demand (new construction).

VI. COMPARISON OF FLORIDA'S MODEL TO OTHER I-O STUDIES

The comparison of the construction based input-output model for Florida was made to other state input-output models and to smaller input-output models generated within the State of Florida. Other state models used for comparison were Missouri [1] and Texas.[2] Input-output models generated within the State of Florida which are used for comparison include Broward County's Port Sector[3] and Alachua County's economic study. [4]

The Missouri model for 1972 shows greater detail of the

economy than the Texas model. Construction is divided into three sectors: general, heavy, and special trades. This analysis compares the aggregation of these sectors to the construction industry in Florida. Figure 5-2 compares the coefficients from the Missouri model to Florida. The values of these coefficients and their rankings are quite similar. Multipliers from the Missouri model were considerably lower. Purchases of maintenance and repair construction by both models were very small. Special trades industry in the Missouri model shows a greater impact on the transaction matrix than the Florida model. The Florida model is lacking in this area of impact due to the proportional separation of the construction industry.

Figure 5-2
State Input-Output model Comparisons

COEFFICIENT COMPARED	FLORIDA	MISSOURI
Household	0.3761	0.3542
Wholesale	0.0718	0.0723
Fabricated Metals	0.0523	0.0508
Retail	------	0.0534
Business Service	0.0504	------
Glass, Stone & Clays	0.0448	0.0214
Lumber	0.0229	0.0235

The Texas model is limited in the number of sectors for analysis. The only comparisons that can be made to the Florida are the coefficients from the household sector at

The input-output models generated within the state of Florida compare favorably to the construction based model. Figure 5-3 compares coefficients of industries with a significant relationship to construction. Multipliers are compared to show their relationships within each model.

Figure 5-3
Comparison of Input-Output Models Within Florida

COEFFICIENTS	FLORIDA	BROWARD	ALACHUA
Household	0.3761	0.3750	0.3560
Wholesale & Retail	0.0718	0.0791	0.0666
Fabricated Metal	0.0523	0.0498	------
Glass, Stone & Clay	0.0448	0.0307	0.0224
Business Service	0.0504	0.0491	0.0287
Lumber	0.0229	0.0129	0.0586
Income Multiplier	2.60	1.63	1.64
Output Multiplier	3.43	2.46	2.35

The different models reviewed in this section indicates that the values generated from the aggregation of certain industries, and the proportional separation of construction, have only a slight variance. Correction may automatically occur with the improvement of Florida's construction data. Figures 5-4 and 5-1 show the impact of Mining, Construction, and Prefabricated wood products & mobile homes have on the total economy.

Figure 5-4

Income Multipliers
Income Generated For Every Add. $1000 In Sector Income

SECTOR	I.M.	$ TO SECTOR	$ TO OTHER SECTORS
Mining	2.409	1000.00	1409.00
Const. Sectors (4-15)	2.602	1000.00	1602.00
Prefab & Mobil Homes	2.985	1000.00	1985.00

Notes to Chapter 5

1. Floyd Harmston, V. Rad, J. Jaswal, and W. Chow, Intersectoral Analysis of the Missouri Economy, Vol. 1 (Columbia: University of Missouri, 1979).

2. Herbert Grubb, The Structure of the Texas Economy, Vol. 1 (Austin Office of Information Services, 1973).

3. John Gordon, D. Mulkey, and James Coggin, An Input-Output Analysis of the Broward County Economy with Emphasis on the Impact and Role of the Port Sector (Gainesville: IFAS, University of Florida, 1980).

4. Alachua County Department of Planning and Development, Alachua County Economic Input-Output Study (Gainesville: Department of Planning and Development, 1984).

CHAPTER 6.

SUMMARY AND CONCLUSIONS

There has been nearly constant economic growth in Florida since 1970. Only the recessions of 1974-76 and 1981-82 marred the upward trends of various economic indicators. As Florida's population has increased by 56%, its economic indicators have climbed at even greater rates. Nonagricultural employment rose 75%, gross sales rose 369%, and total state personal income rose 379%. The construcion industry directly accounts for 7% of Florida's employment, and indirectly for much more.

The construction industry is an important part of the economy of Florida. the impact of the construction industry itself is large, but construction also permeates many other segments of Florida's economy. For example, about 30% of the mining industry is directly related to construction, as is 11.8% of manufacturing employment, and nearly 5% of wholesale and retail trade employment. The construction industry is also closely tied to the finance, insurance, and real estate industry, services, forestry, and even government. The construction industry provides Florida government with a large tax base through sales taxes, other taxes, and licensing fees. However, the construction industry is very volatile; construction falls off rapidly in times of recession. Sales tax revenues from the

construction industry have dropped from 11.1% of state revenues in 1974, to only 7.0% in 1983. Construction related employment is nearly as volatile as the construction industry itself, dropping dramatically in times of recession. A strong construction industry is important to the other sectors of the economy of Florida.

Chapter 3 presented data on several subsections of the construction, mining, and mobile homes industries. Division of the construction industry into categories developed by the U. S. Census, Department of Labor, University of Florida Bureau of Economic and Business Research, Standard Industrial Classification Codes, and Florida Contractors' Licensing Law aided discussion. Florida's mining industry is closely tied to the construction industry, since much mining activitky centers on construction materials such as limestone, dolomite, coquina, and sand. Like construction, mining activity declines in times of recession; nevertheless, a moderate growth rate for mining is forecast. Ten major categories of the construction industry were discussed, and several of these were subdivided into 19 additional categories. Maps presented data on areas of high economic impact in these categories. Employment figures, total construction receipts, and value added were compared for the years 1977 and 1982. Total construction receipts and value added increased in all cases, although it should be noted that no correction for inflation was made.

Employment figures increased in all categories except Florida Operative Builders (down 10%), Industrial and Warehouse construction (down 2.5%), Highway and Street construction (down 19.4%), and Floor Laying (down 0.2%). These census figures for employment, total receipts, value added, and 1982 net receipts were summarized in Table 3-6. The use of mobile homes is on the increase in Florida. The mobile home industry is a potential growth area in the Florida economy.

Construction employment and receipts in Florida are considerably higher than the national average, and Florida is forecast to have 5 of the nation's top 20 housing markets for 1984. The outlook for Florida's construction industry is favorable.

Chapter 4 defined four types of economic impacts: direct, indirect, induced, and total impacts. Direct economic impacts are associated with the actual production of a product. Indirect economic impacts are additional economic activity generated, for example through subcontracts. Induced economic impact includes the spending of wages by workers. Total economic impact is the sum of direct, indirect, and induced impacts. Economic impact must be seen as a chain reaction of spending characterized by a multiplier effect - the total respending which results from a given dollar increase in the output of an industry.

Input-Output modelling is a type of analysis developed

to show economic interrelationships between industries. A matrix is developed listing output down the left and the purchers of inputs across the top. The sum of the outputs must equal the sum of the inputs. Input-Output analysis involves three phases. The first phase, Transactions, shows the flow of goods and services in dollar amounts for one year. The second phase, Technical Coefficients, shows the amount of input required from the industry at the left for each dollar of output produced by the industry at the top. These Technical Coefficients can be used to calculate the amount of direct purchase requirements as a result of an increase or decrease in the output of one or more of the purchasing industries. The third phase, Total Requirements, is used to obtain multipliers for computing the total impact of any sector in this economy.

Multipliers measure the ripple effect of change in final demand of one industry on the whole economy. There are three types of multipliers: Output multipliers, Income multipliers, and Employment multipliers. Ouotput muyltipliers show what is needed from other industries as demand changes. Industries with large output multipliers have a large percentage of the required inputs coming from within the local econbomy. Income multipliers reflect the impact of change in income and should be interpreted with caution when dealing with their changes in output. A high income multiplier indicates strong structural ties with

other local industries. Employment multipliers indicate the employment directly required per dollar change in final demand.

With these background factors in mind, the chapter proceeds to develop a construction based Input-Output model for the state of Florida. For the purpose of this model, sectors of the economy defined by the Standard Industrial Classification (SIC) Code of the U. S. Office of Management and Budget was utilized, yielding 43 sectors. A study by the Institute of Food and Agricultural Sciences of the University of Florida for 1980 was modified and updated with 1982-83 data for the model discussed in this report. Several corrrective factors were introduced, and limiting assumptions of Input-Output analysis were discussed.

The results of the Input-Output analysis were discussed in Chapter 5. Florida's construction industry has a high impact on the economy of the state as demonstrated by the analysis. High income multipliers indicate that the construction industry is closely tied to other Florida industries. The high sales multipliers show that for every dollar increase in final demand for construction, an additional $2.43 of economic activity is generated in other sectors of Florida's economy. Output attributable to the construction industry is over 17% of the state's 1982 total output. High employment multipliers demonstrate a high level of interaction that the construction industry has with

employment in other sectors of the Florida economy. Approximately 18% (750,000) of Florida employees are attributable to the construction industry. High income and sales multipliers indicate that growth in the construction industry adds even greater growth to other sectors of Florida's economy.

Taken together, the data presented in this report show that the construction industry has a profound impact on the economy of the state of Florida. The construction industry is closely tied in with other segments of Florida's economy. A healthy construction industry is vital to the future of Florida.

BIBLIOGRAPHY

Alachua County Department of Planning and Development. Alachua County Economic Input-Output Study. Gainesville, Florida: Department of Planning and Development, September 1981.

Babbie, Earl R, Survey Research Methods. Belmont, California: Wadsworth Publishing Company, Inc., 1973.

Bruckman, Gerhart, Input-Output Approaches in Global Modeling, Vol. 3, New York: Pergamon Press, 1980.

Bureau of Economic and Business Research, 1982 Florida Statistical Abstract, College of Business Administration, The University Presses of Florida, Gainesville, 1982.

Bureau of Economic and Business Research, 1983 Florida Statistical Abstract, College of Business Administration, The University Presses of Florida, Gainesville, 1983.

Bureau of the Census, 1977 Census of Construction Industries, South Atlantic States. Washington D.C.: U.S. Department of Commerce, 1978.

Bureau of the Census, 1977 Census of Manufacturing, South Atlantic States. Washington D.C.: U.S. Department of Commerce, 1978.

Bureau of the Census, 1982 Census of Constructions Industries Preliminary Report, Washington D.C.: U.S. Department of Commerce, 1984.

Cameron, Burgess, Input-Output Analysis and Resource Allocations. London: Cambridge University Press, 1968.

Cassimatis, Peter J., Economics of the Construction Industry. New York: National Industrial Conference Board, Inc., 1969.

Chapin, F. Stuart, Jr., and Edward J. Kiser, Urban Land Use Planning, 3rd Ed. Urbana, Illinois: University of Illinois Press, 1979.

Division of Economic Development, State Data Base, Version 3, August, 1983.

Fishkind, Hank, Engler, Sheldon, Hargrave, Scott, Paisley, Boney, The Outlook for Residential Construction in Florida, Bureau of Economic and Business Research, University of Florida, Gainesville, Florida, 1979.

Florida Chamber, (The), Directory of Florida Industries, Florida Chamber of Commerce, Post Office Box 5497, Tallahassee, Florida, 1981.

Florida Chamber, (The), Economic Profile of Florida Counties, Florida Chamber of Commerce, 136 South Bronough Street, Tallahassee, Florida 32302.

Florida Department of Revenue, Rules and Regulations of Florida Sales and Use Tax Law, Tallahassee, Florida, 1984.

Gordon, John, David Mulkey, and James Goggin. An Input-Output Analysis of the Broward County Economy with Emphasis on the Impact and Role of the Port Sector, Food and Resource Economics Department, IFAS, University of Florida, Economics Report 96, May 1980.

Gordon, John, and David Mulkey, The Economic Importance of the Sugar Industry in South Florida. Food and Resource Economics Department, IFAS, Staff Paper #117, February 1979.

Gossling, W. F. Input-Output and Throughput, London: Input-Output Publishing Company, 1975.

Grubb, Herbert W., The Structure of the Texas Economy, Vol. 1, Austin, Texas: Office of Information Services, March 1973.

Harmston, Floyd K., Vaman Rao, Jasbir S. Jaswal, and Wayne S. Chow, Intersectoral Analysis of the Missouri Economy, Vol. 1, Columbia, Missouri: University of Missouri-Columbia, 1979.

Helsig, Jane T., SAS Introductory Guide, Cary, N.C., SAS Institute, 1978.

Isard, Walter, and Thomas W. Langford, Regional Input-Output Study. Cambridge, Mass.: MIT Press, 1971.

Klugh, Henry E., Statistics: The Essentials for Research, New York: John Wiley & Sons Co., Inc., 1974.

Krueckeberg, Donald A. and Arthur L. Silvers, Urban Planning Analysis: Methods and Models. New York: John Wiley & Sons, Inc., 1974.

Leontief, Wassily, Input-Output Economics, New York: Oxford University Press, 1966.

Loehman, Edna T. and Robert McElroy, Input-Output Analysis as a Tool for Regional Development Planning, Food and Resource Economics Department, IFAS, University of Florida, Economics Information Report 107, March 1979.

Miernyk, William H., The Elements of Input-Output Analysis. New York: Random House, 1965.

MIT Center for Computational Research in Economics and Management Science and MIT Information Processing Services, Troll User's Guide: Massachusetts Institute of Technology, Cambridge, MA, 1980.

Morrison, W.I., and P. Smith, Input-Output Methods in Urban and Regional Planning: A Practical Guide, New York: Pergamon Press, 1977.

National Conference of States on Building Codes and Standards, Inc., Mobile Home Program Statistics, 481 Carlisle Drive, Herndon, Virginia, 1982.

Northeast Regional Data Center, NERDC User's Manual: General, Gainesville, Florida: Northeast Regional Data Center, 1982.

Northeast Regional Data Center, NERDC User's Manual: TCP, Gainesville, Florida: Northeast Regional Data Center, 1982.

Northeast Regional Data Center, NERDC User's Manual: Utilities, Gainesville, Florida: Northeast Regional Data Center, 1982.

Richardson, Harry W., Input-Output and Regional Economics, New York: John Wiley & Sons, Inc., 1972.

Rosander, A.C., Elementary Principles of Statistics, New York: D. Van Nostrand Company, Inc., 1951.

SAS Institute, SAS User's Guide, Basics. 1982 Ed. Cary, N.C.: SAS Institute, 1982.

Stone, Richard, Input-Output and National Accounts, Paris: O.E.E.C. Publications, 1961.

Theil, Henri, System-Wide Explorations in International Economics, Input-Output Analysis, and Marketing Research, New York: North Holland Publishing Company, 1980.

U.S. Bureau of the Census, Statistical Abstract for the United States 1982-83, 103rd Ed. Washington D.C.: U.S. Government Printing Office, 1983.

U.S. Department of Commerce, County Business Patterns, Florida, U.S. Government Printing Office, 1980.

U.S. Department of Commerce Bureau of Industrial Economics, Construction Review, U.S. Government Printing Office, September - October, 1983.

U.S. Department of Labor, Employment and Earnings, Washington D.C.: Government Printing Office, July 1983.