

A Report from the Department of Business, Economic Development & Tourism

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Economic Analysis Division

BENJAMIN J. CAYETANO
Governor

SEIJI F. NAYA
Director

PHILIP J. BOSSERT
Deputy Director

PEARL IMADA IBOSHI
Division Head

ROBERT SHORE
Editor

Direct Inquiries to:
Hawaii's Economy
DBEDT

P.O. Box 2359
Honolulu, Hawaii 96804
Fax: (808) 586-8449

E-mail: hecon@dbedt.hawaii.gov
This report is also available on the internet at:
www.hawaii.gov/dbedt/hecon.html

Construction and Hawaii's Economy

This issue of Hawaii's economy takes a look at the construction industry and the role it plays in the economy. The report also introduces a new construction information web site developed by DBEDT to help inform both the industry and community about construction opportunities and conditions.

Construction is a vital industry in Hawaii's economy. Without it we would not have much of an economy. The industry builds our homes, businesses, recreation facilities and infrastructure systems like highways, power stations and other utilities. Construction also has a big impact on other industries. The outside loans that fund most local construction inject huge amounts of new money into the state and have a widespread impact on all business activity, very similar to the impact of a major export industry. Alternatively, when the inflow of construction funds slows or stops, the loss of these funds is felt throughout the economy.

Over the past eight years or so, construction has been hard hit by the State's economic slowdown. Since 1991 the industry has lost more than a third of its workforce and sales.

However, growing optimism about the prospects for the economy coupled with a reduction in the residential and commercial inventory have rekindled demand for new investment and building activity. Projects and permits for new private construction have taken an upward turn in the last half-year and

hotel-construction-completed increased in 1999 for the first time since 1993. This upturn has apparently stabilized employment in the industry and should result in employment growth this year, if the upward trend in new building authorizations can be sustained.

How did construction become such a key and volatile sector of Hawaii's economy? Moreover, what are the industry's prospects for 2000 and beyond?

Construction in the Post Statehood Era

Construction's dominant role in the state's economy dates back to Statehood in 1959, which focused tremendous investment interest, as well as tourist interest, in Hawaii. As Figure 1 on page 3 shows, construction activity accelerated in the mid 1960s, and accounted for 8.2% of the State's Gross State Product in 1970. This share of the economy was 50 percent more than the share held by construction in the national economy. Of course, the driving force in this increase in construction was the post-statehood tourism boom and related investment activity.

Most of the post-statehood era has been a roller-coaster ride for construction, with periods of spectacular growth alternating with deep contractions. The industry hit post-statehood peaks in 1960, 1970, 1975, 1980, and 1992. These peaks were followed by declines in which the industry lost, on average,

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Construction in the 21st Century

By Dr. Seiji Naya, *Director*
Department of Business, Economic Development & Tourism

The health and vitality of the construction industry is very important to Hawaii's economy. Without a skilled, well-managed and efficient construction industry, new investment cannot be translated into the facilities and infrastructure needed to propel Hawaii into the new, 21st century global economy.



Seiji Naya

Construction is coming out of its most serious slump since statehood. During this period the State has done its best to cushion the downturn. Between 1995 and 1999 Governor Cayetano accelerated over a \$1 billion in planned State projects to help counter declines in private construction. The State and Counties have also streamlined permit approval processes and reduced quite a number of regulations to help speed new development projects to the construction stage. With the economy improving what

we need to do now is help construction to move into the new economy of the 21st century with the emerging, technology-based industries.

Fortunately, there has developed a considerable amount of leadership within the industry to address transition issues by such organizations as the Building Industry Association, the General Contractors Association and the various labor unions. Of particular note is the emergence of the Pacific Resource Partnership (PRP), founded by the Carpenters' Union and its signatory contractors. This has become a model organization for bringing about union and management cooperation by providing its member organizations with information and guidance to navigate through the difficult transition into the new economy. Moreover, the organization has worked with government and the rest of the business community to promote the broader growth of Hawaii's technology industry and improve education.

One way that State government is helping construction's transition is by improving the quality and flow of important information to help firms in the industry make better decisions. This report and the development of DBEDT's construction industry web site represent initiatives by DBEDT to expand information for and about the construction industry. It is an initial effort that will be expanded as information and research on the industry accumulates and input from the industry and policy makers is received.

While we emphasize the future potential of such growth engines as high technology and diversified tourism, it is construction that will make these new industries a physical reality. Therefore, we are committed to working with the industry to see it regain its health and vitality and become an active partner in building Hawaii's economic future in the 21st century.



DBEDT's New Construction Web Site

In an effort to provide a virtual, one-stop construction information center for the industry and community, DBEDT's Business Resource Center developed a construction industry internet website, which can be accessed directly at www.hawaii.gov/dbedt/build, or from a link on the Department's Home page at www.hawaii.gov/dbedt.

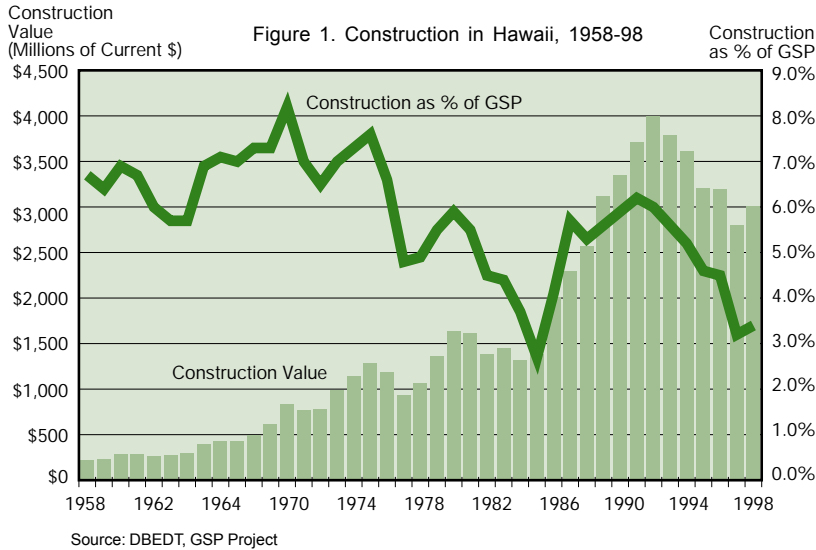
The site features links to important sources of information for industry participants and those who monitor construction activity. This report will be available on the site as will future updates and new reports of interest to the construction industry. The site and its links include information on upcoming Federal, State and County government construction jobs, economic and statistical data on the industry and access to organizations and agencies that can provide a wide range of useful information for the construction and development sector.

Most industry members are probably familiar with many of the site links within the DBEDT Construction pages. However, the site provides one convenient location to access many sites that will be of interest, including information developed by DBEDT.

The site is a "living" repository of information and new products and links will be added as they are developed, or suggested by users. The site provides an e-mail address for suggestions at build@dbedt.hawaii.gov.

Construction and Hawaii's Economy

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Oahu versus the Neighbor Islands

As shown in Figure 4, Honolulu dominated statewide construction activity from Statehood until the late 1970s. Then development on the Neighbor Islands took off and began accounting for an increasing proportion of new construction. In 1989 and 1990 construction on the neighbor islands exceeded the value of construction on Oahu.

The Figure also shows that Neighbor Island construction was the first to feel the impact of the 1990s building decline as first mainland U.S. and then Asian tourism softened. This is despite a substantial amount of Hurricane Iniki Recovery work on Kauai in 1993. Both Neighbor Island and Oahu construction activity appears to have bottomed out in 1997 in terms of value. All counties showed an increase in the value of construction activity in 1998. Total construction employment, however, continued to decline into 1999.

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about 25 percent of its peak-year value. The declines tended to become more severe as time went on. In the most recent decline, from 1992 to 1997, the industry lost nearly 43 percent of its peak-year value.¹

Figures 2 and 3 compare the relative proportions of the economy held by construction at the state and national levels in terms of both value and jobs. Through most of the post-statehood period, Hawaii construction has been a larger proportion of the economy than its counterpart at the national level.

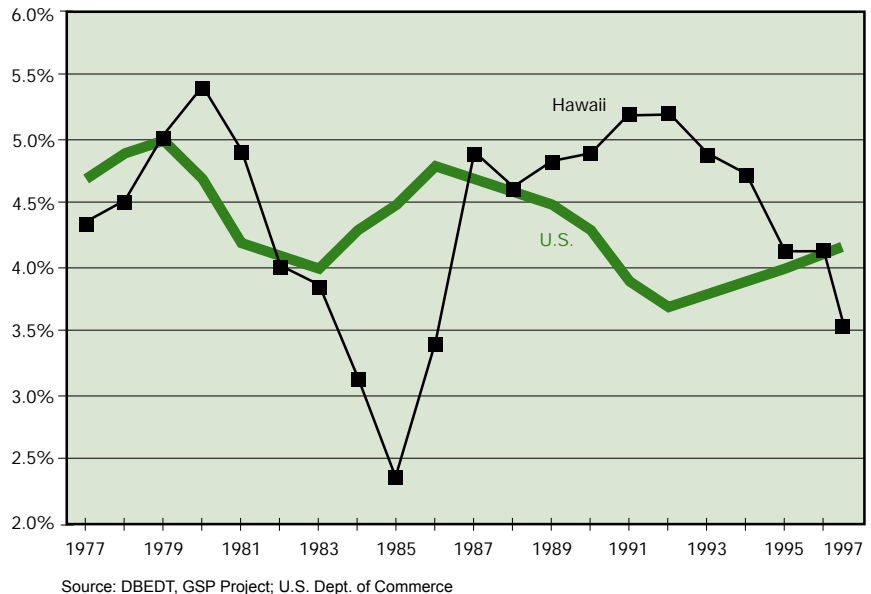
However, this proportion has declined over time for Hawaii, particularly in terms of jobs. By the end of the most recent decline from 1992 through 1997, construction's share of Hawaii's economy was actually below the corresponding national share in terms of jobs.

What the most recent decline has meant in numerical terms is sobering. In 1999 jobs in the construction industry averaged about 20,400, down from nearly 33,600 in 1991. Likewise, the total taxable value for construction work completed was \$3.0 billion in 1999, down from more than \$4 billion in 1991.²

The decline was triggered by the collapse of Japanese investment, as serious economic problems developed in Japan and was compounded by a poorly performing U.S. economy. A high inventory of commercial space in Hawaii

created by speculative building in late 1980s construction boom also discouraged investment. That boom, driven in large part by foreign investment from Japan, put more office space, hotel rooms and residential units on the market than could be absorbed during the slow economy of the 1990s. This tendency for construction swings to be wider than for the economy as a whole is discussed in some detail later on in this report.

Figure 2. Construction's Share of the Economy (percent of Gross Product)



¹ All dollar values are in "current dollar terms," that is, not adjusted for inflation.

² Tax base for General Excise Tax purposes.

New Private Construction Expenditures (in \$mils), selected years 1960 - 1998

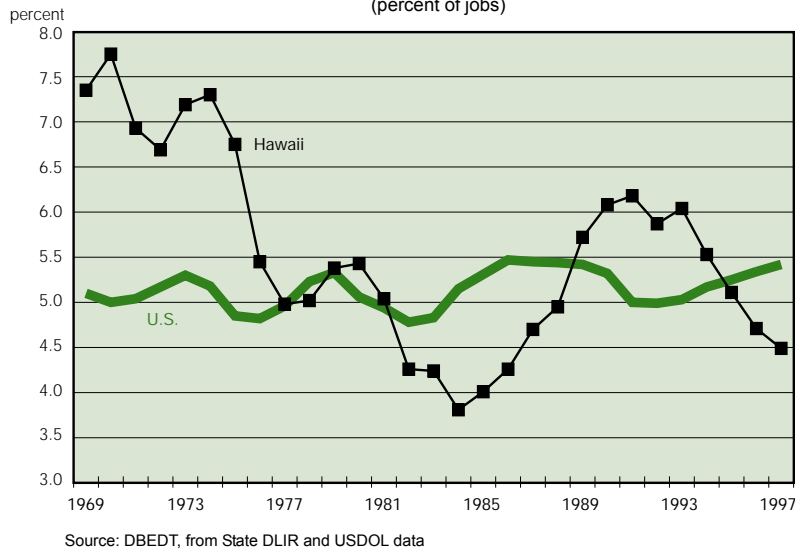
LINE	Type of Construction	1960	1965	1970	1975	1980	1985	1990	1995	1998
1	New Private Expenditures ¹	181.1	227.9	550.8	849.2	1230.5	988.3	2430.3	1890.8	1440.7
2	Honolulu	162.1	187.9	435.8	589.9	670.5	586.5	1320.7	1249.2	910.6
3	Hawaii	8.2	19.6	53.6	90.1	189.7	123.4	435.1	285.7	211.4
4	Kauai	3.0	7.3	18.2	37.8	144.8	70.2	232.9	150.8	126.8
5	Maui	7.8	13.1	43.2	131.4	225.5	208.2	441.5	205.1	191.9
6	Non-Residential Buildings & Construction	90.8	122.0	289.8	317.5	683.3	540.2	1265.2	895.0	723.1
7	Honolulu	80.6	96.4	223.7	224.9	421.4	336.4	722.4	597.9	476.4
8	Hawaii	3.8	13.1	32.9	40.5	99.2	53.4	213.0	141.0	93.3
9	Kauai	1.8	4.3	11.5	17.1	45.5	26.8	109.5	54.8	67.7
10	Maui	4.6	8.2	21.7	35.0	117.2	123.6	220.3	101.3	85.7
11	Non-Residential Buildings	56.8	72.0	196.1	192.1	444.2	372.7	792.3	550.2	485.9
12	Honolulu	50.0	54.8	157.1	144.7	300.6	243.3	497.7	377.2	335.9
13	Hawaii	2.1	9.1	22.6	30.0	67.7	29.3	116.2	80.9	53.2
14	Kauai	1.2	2.6	3.3	9.5	15.4	14.5	55.7	36.8	47.8
15	Maui	3.5	5.5	13.1	7.9	60.5	85.6	122.7	55.3	48.9
16	Hotels	20.5	20.3	81.1	38.1	95.1	165.0	87.2	0.0	19.3
17	Honolulu	17.1	11.1	66.1	19.3	16.4	100.3	0.0	0.0	0.0
18	Hawaii	0.9	5.5	8.2	16.4	44.8	0.0	39.5	0.0	0.0
19	Kauai	0.6	0.9	1.2	2.4	0.9	0.0	0.0	0.0	19.3
20	Maui	1.9	2.8	5.6	0.0	33.0	64.7	47.6	0.0	0.0
21	Commercial ²	36.3	51.7	115.0	154.0	349.1	207.7	705.1	550.2	466.6
22	Honolulu	32.9	43.7	91.0	125.4	284.2	143.0	497.7	377.2	335.9
23	Hawaii	1.2	3.6	14.4	13.6	22.9	29.3	76.7	80.9	53.2
24	Kauai	0.6	1.7	2.1	7.1	14.5	14.5	55.7	36.8	28.6
25	Maui	1.6	2.7	7.5	7.9	27.5	20.9	75.0	55.3	48.9
26	New Buildings	26.3	36.0	83.7	114.2	202.2	104.0	471.6	366.3	243.1
27	Honolulu	24.0	30.5	66.4	91.6	149.9	66.4	348.2	239.5	166.6
28	Hawaii	0.6	2.8	11.5	11.5	17.3	16.5	58.0	55.9	34.3
29	Kauai	0.5	1.1	1.6	4.8	12.0	8.6	22.8	30.3	14.4
30	Maui	1.2	1.6	4.2	6.3	23.0	12.5	42.6	40.6	27.9
31	Additions and Alterations	10.0	15.7	31.3	39.8	146.9	103.7	233.6	183.9	223.5
32	Honolulu	8.9	13.2	24.6	33.8	134.3	76.6	149.5	137.7	169.3
33	Hawaii	0.6	0.8	2.9	2.1	5.6	12.8	18.7	25.0	19.0
34	Kauai	0.1	0.6	0.5	2.3	2.5	5.9	33.0	6.5	14.2
35	Maui	0.4	1.1	3.3	1.6	4.5	8.4	32.4	14.7	21.0
36	Non-Structural Activity	34.0	50.0	93.7	125.4	239.2	167.5	472.9	344.9	237.2
37	Honolulu	30.6	41.6	66.6	80.2	120.8	93.1	224.8	220.7	140.5
38	Hawaii	1.7	4.0	10.3	10.5	31.5	24.1	96.7	60.1	40.1
39	Kauai	0.6	1.7	8.2	7.6	30.2	12.3	53.8	18.1	19.8
40	Maui	1.1	2.7	8.6	27.1	56.7	38.0	97.6	46.0	36.8
41	Construction ³	21.6	31.7	59.5	79.6	151.8	106.3	315.3	229.9	158.1
42	Honolulu	19.4	26.4	42.3	50.9	76.7	59.1	149.8	147.1	93.6
43	Hawaii	1.1	2.5	6.5	6.7	20.0	15.3	64.5	40.1	26.7
44	Kauai	0.4	1.1	5.2	4.8	19.1	7.8	35.8	12.0	13.2
45	Maui	0.7	1.7	5.5	17.2	36.0	24.1	65.1	30.7	24.5
46	Architect and Engineer Fees	12.4	18.3	34.2	45.8	87.4	61.2	157.6	115.0	79.1
47	Honolulu	11.2	15.2	24.3	29.3	44.1	34.0	74.9	73.6	46.8
48	Hawaii	0.6	1.5	3.8	3.8	11.5	8.8	32.2	20.0	13.4
49	Kauai	0.2	0.6	3.0	2.8	11.1	4.5	17.9	6.0	6.6
50	Maui	0.4	1.0	3.1	9.9	20.7	13.9	32.5	15.3	12.3
51	Residential Buildings	90.3	105.9	261.0	531.7	547.2	448.1	1165.1	995.8	717.6
52	Honolulu	81.5	91.5	212.1	365.0	249.1	250.1	598.3	651.3	434.2
53	Hawaii	4.4	6.5	20.7	49.6	90.5	70.0	222.2	144.7	118.0
54	Kauai	1.2	3.0	6.7	20.7	99.3	43.4	123.4	96.0	59.1
55	Maui	3.2	4.9	21.5	96.4	108.3	84.6	221.2	103.8	106.2
56	New Dwellings	82.0	89.1	242.1	491.2	486.5	371.8	947.2	762.2	577.9
57	Honolulu	74.7	77.2	196.8	331.2	208.4	195.7	430.1	483.7	333.7
58	Hawaii	3.6	5.2	18.6	46.4	83.2	63.7	210.2	103.3	101.0
59	Kauai	1.1	2.5	6.2	19.0	95.6	37.7	106.5	86.1	50.7
60	Maui	2.6	4.2	20.5	94.6	99.3	74.7	200.5	89.1	92.5
61	Single Family Units	44.3	64.2	106.0	114.8	246.3	325.0	665.0	586.5	413.7
62	Honolulu	37.7	52.7	77.9	61.4	129.7	167.5	256.5	341.7	190.7
63	Hawaii	3.2	5.1	13.8	22.3	48.9	49.4	175.8	100.1	96.5
64	Kauai	1.1	2.4	6.1	11.8	29.5	33.6	104.4	69.7	46.9
65	Maui	2.3	4.0	8.2	19.3	38.2	74.5	128.3	75.0	79.6
66	Multi-Family Units	37.7	24.9	136.1	376.4	240.2	46.8	282.1	175.7	164.2
67	Honolulu	37.0	24.5	118.9	269.8	78.7	28.2	173.6	142.0	143.0
68	Hawaii	0.4	0.1	4.8	24.1	34.3	14.3	34.3	3.2	4.5
69	Kauai	0.0	0.1	0.1	7.2	66.1	4.1	2.1	16.4	3.8
70	Maui	0.3	0.2	12.3	75.3	61.1	0.2	72.1	14.1	12.9
71	Additions and Alterations	8.3	16.8	18.9	40.5	60.7	76.3	217.9	233.6	139.7
72	Honolulu	6.8	14.3	15.3	33.8	40.7	54.4	168.2	167.6	100.5
73	Hawaii	0.8	1.3	2.1	3.2	7.3	6.3	12.0	41.4	17.0
74	Kauai	0.1	0.5	0.5	1.7	3.7	5.7	17.0	9.9	8.5
75	Maui	0.6	0.7	1.0	1.8	9.0	9.9	20.7	14.7	13.7

Source: DBEDT, GSP Project

Construction and Hawaii's Economy

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Figure 3. Proportion of Construction Jobs in the Economy, Hawaii & U.S. (percent of jobs)



Type of Construction

While tourism and related business activity was the driving economic force in Hawaii's post-Statehood economy, the focus of most construction activity over the years has been on residential and government infrastructure. As Figure 5 shows, commercial construction, including hotels, has been a relatively small part of total construction, even during the hotel-building boom of the late 1980s.

Partly because of the high concentration of Federal military activity in Hawaii, the government sector has played a large role in determining the level of construction, accounting on average for about 36% of the total in the post-statehood period. However, as Figure 5 suggests, the proportion of government construction has been even higher in recent years. Between 1993 and 1998, all levels of government accounted for nearly 45 percent of total construction in the state. Factors increasing the public sector proportion included State efforts to accelerate projects, an upturn in Federal construction and the effect of the decline in private sector construction.

As Figure 6 shows, all three levels of government —State, Local and Federal — showed increased activity in the early 1990s. Government also maintained a high share of total construction as private

construction declined sharply in the mid 1990s. The acceleration in State government projects after 1995 coupled with more intensive construction in the Federal sector provided major support for the industry during the mid-1990s.

It should be noted that a good deal of state funded infrastructure construction is actually paid for by the Federal government through grant programs such as those of the Federal Highway Administration. Other substantial sources of state construction financing include airport and

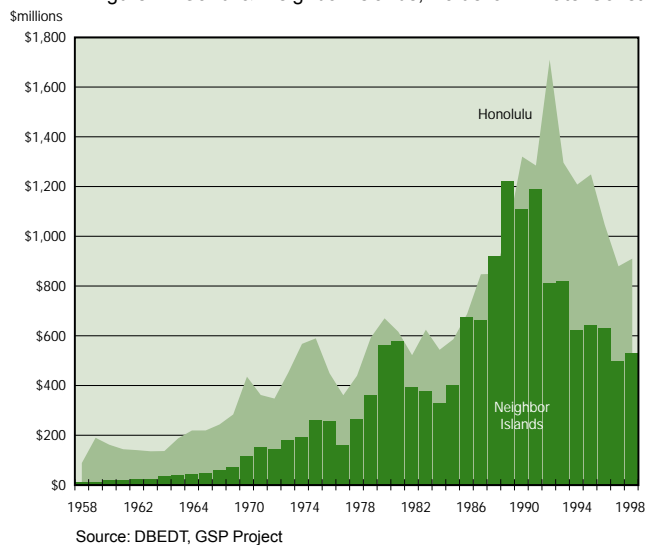
harbor user fees. Construction activity related to the State airport system and completion of the H-3 Freeway were important factors in the volume of state construction in the 1990s.

Residential construction has averaged about 30 percent of total construction value since statehood, ranging from a low of 21% in 1961 to a high of 45% in 1981. Over the past three years residential construction has accounted for about 27 percent of total construction value.

Compared with the nation as a whole, a much higher proportion of residential construction in Hawaii has been multi-family type housing. Nationally, multi-family residential construction has represented about 10 to 15 percent of new residential units by value. However, multi-family construction in Hawaii has averaged nearly 40 percent of new-unit value since statehood. The proportion was very high through the mid 1980s (about 48 percent) but has fallen off to an average of 27 percent since then. The high cost of building during the boom years coupled with a high proportion of non-family households tended to favor the multifamily (mainly condominium) market in the first two decades of statehood. However, the opening of Central and Leeward Oahu for single family housing and a slower economy

continued on next page

Figure 4. Oahu & Neighbor Islands, Value of Private Construction



Construction and Hawaii's Economy

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have made single family units more affordable over the past decade. In addition, accelerated family formation since the mid-1980s has shifted consumer demand from multi-family to single-family units.

Construction in 2000 and Beyond

There are signs that construction in Hawaii may have turned the corner. Permits for new construction have taken a sharp upturn in recent months. As Figure 7 shows, permit values have been generally increasing since the summer of 1998 and accelerated noticeably in the last half of 1999. Permit values generally lead changes in actual construction by a number of months. If this pace continues, the year 2000 may be the start of a welcome growth trend for the industry.

The slide in the construction job count appeared to stabilize in 1999 for the most part. However, construction jobs have yet to respond noticeably to the upturn in permit values. Assuming permit values continue to increase, construction jobs should begin to show an increase in the first half of 2000.

Figure 8 indicates that all three of the major components of private sector permit values appeared to be moving upward in 1999. Over the course of the construction slump in the 1990s, "additions and alterations" was the most stable component. While it did not grow, this component provided a buffer against the declines in residential and commercial construction.

Thus, the first year of the 21st century may well be a year of recovery for Hawaii's beleaguered construction industry. Hopefully, it will be the first of a number of rebuilding years for the industry. However, it will likely be a long time, if at all, before the industry will see the employment levels of the late 1980s and early 1990s. The structural change occurring in Hawaii's economy has a bias towards slower long-term growth. The sheer size of tourism and other larger industries in the state makes it difficult to achieve rates of growth beyond the 2% to 4% per year range. In addition, population growth has slowed considerably in the past four

Hawaii State Government Capital Improvement Projects Expenditures (in \$mils)						
	1992	1993	1994	1995	1996	1997
Education	91.4	228.9	234.4	223.4	246.3	250.3
Design	9.9	9.7	10.3	72.1	11.9	8.7
Planning	1.1	0.5	0.9	1.4	1.0	1.0
Construction	79.9	200.7	221.5	147.3	230.9	238.4
Equipment	0.4	18.0	1.7	2.6	2.5	2.2
Public Safety	41.0	19.4	15.4	10.0	11.0	17.8
Design	2.7	4.4	2.9	0.5	0.6	1.0
Planning	0.1	0.0	0.2	0.3	0.1	0.1
Construction	38.0	14.9	12.1	9.1	10.1	16.7
Equipment	0.0	0.0	0.2	0.1	0.1	0.1
Health	31.9	22.3	35.1	36.8	8.6	5.2
Design	2.3	0.5	0.4	0.5	0.7	0.7
Planning	0.2	0.2	0.6	0.2	0.1	0.2
Construction	29.3	21.3	33.9	35.7	6.9	4.3
Equipment	0.0	0.3	0.1	0.4	0.9	0.0
Welfare	18.7	165.5	33.9	17.1	32.6	3.3
Design	1.6	2.4	0.9	0.7	0.2	0.4
Planning	0.7	0.1	0.0	0.1	0.0	0.0
Construction	16.3	163.0	32.7	16.4	32.3	3.0
Equipment	0.1	0.0	0.3	0.0	0.1	0.0
Culture and Recreation	36.7	28.6	26.6	23.6	9.7	29.5
Design	22.1	2.6	1.6	8.4	0.4	0.2
Planning	3.8	0.4	1.7	0.7	0.3	0.3
Construction	10.2	25.5	23.2	14.5	8.6	29.1
Equipment	0.6	0.1	0.2	0.1	0.5	0.0
Economic Development	29.7	17.7	158.4	44.1	80.7	114.6
Design	3.6	1.6	1.7	8.3	1.7	0.8
Planning	0.5	0.3	0.7	0.5	1.7	1.8
Construction	25.6	15.7	155.8	34.7	77.3	111.8
Equipment	0.0	0.1	0.2	0.5	0.1	0.2
Highways	272.6	277.8	269.1	198.1	187.9	202.2
Design	17.0	9.8	14.7	10.2	8.9	6.4
Planning	0.1	2.0	5.3	4.4	3.9	9.8
Construction	249.2	216.7	235.0	177.4	152.9	185.9
Equipment	0.0	0.1	0.0	0.0	0.3	0.0
Land purchase	6.2	49.3	14.0	6.1	22.0	
Airport	504.0	301.3	122.4	58.6	39.2	26.5
Design	55.2	52.3	20.8	12.1	7.3	5.1
Planning	1.3	0.8	4.5	2.2	0.2	2.6
Construction	298.5	241.5	97.1	43.8	29.9	18.8
Equipment	0.3	0.0	0.0	0.0	0.0	0.0
Land purchase	148.8	6.7	0.0	0.4	1.8	0.0
Water Transport and Terminals	20.5	14.0	43.1	34.5	31.9	17.8
Design	1.2	1.5	2.3	1.4	0.8	1.2
Planning	0.1	0.7	0.4	0.3	0.4	0.7
Construction	19.2	11.8	40.4	32.8	30.7	16.0
Conservation of Natural Resources	2.5	8.9	5.8	6.3	2.6	6.6
Design	1.5	0.6	0.6	1.2	0.5	0.0
Planning	0.2	0.6	0.9	0.3	0.0	1.3
Construction	0.8	7.6	4.3	4.8	2.1	5.4
TOTAL CONSTRUCTION ¹	767.2	918.7	855.9	516.6	581.6	629.3
TOTAL CIP	1,049.0	1,084.5	944.2	652.6	650.6	673.9

Source: DBEDT from State data.

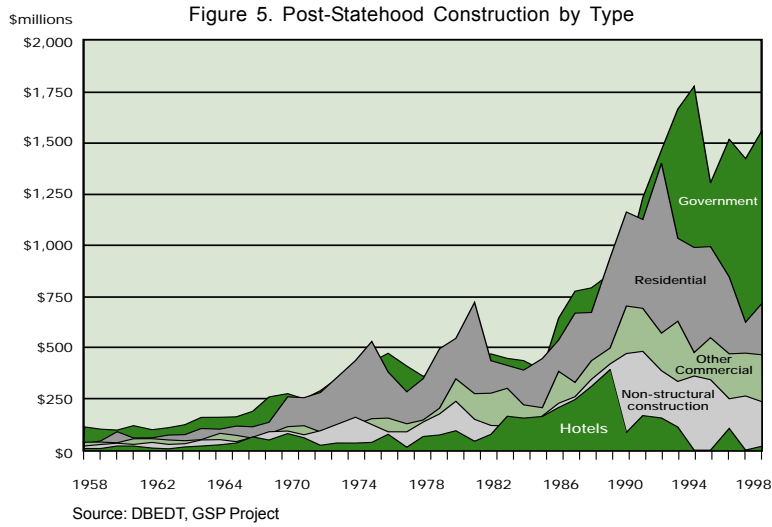
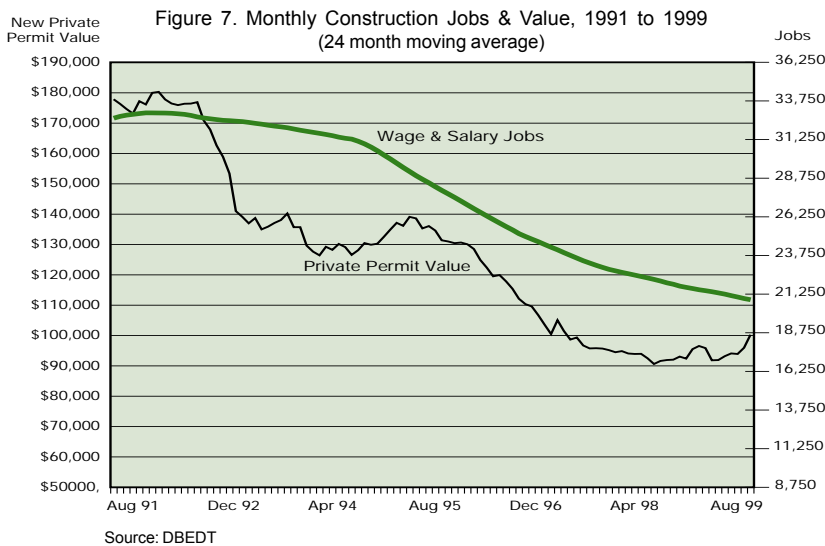
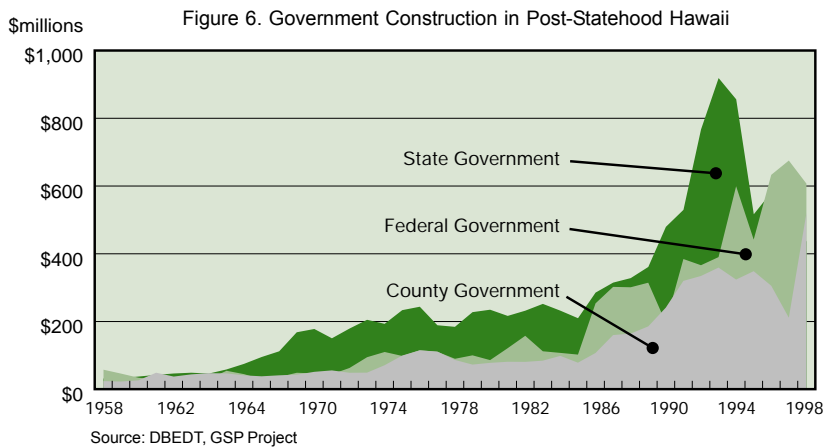


Table 1.
Value of Construction in Hawaii, 1958 to 1998
(millions of current dollars)

Year	Government			
	Private	State	County	Federal
1958	98.8	31.8	24.4	57.7
1959	121.3	33.3	23.2	46.2
1960	181.1	37.6	26.8	34.0
1961	164.3	42.5	49.2	28.2
1962	165.0	46.6	37.8	15.7
1963	159.0	48.9	44.3	17.0
1964	169.8	46.4	47.8	30.4
1965	227.9	58.5	47.2	54.6
1966	263.1	75.0	41.4	44.6
1967	267.4	95.2	38.6	29.4
1968	301.6	112.1	41.5	36.4
1969	356.7	168.3	43.4	48.7
1970	550.8	178.0	51.8	46.8
1971	512.5	150.5	56.0	44.5
1972	490.9	179.2	49.1	62.9
1973	631.7	205.1	49.4	94.7
1974	760.2	193.2	71.3	110.1
1975	849.2	233.6	99.8	98.4
1976	707.0	243.7	115.2	115.2
1977	519.2	189.0	111.6	110.6
1978	702.4	184.4	86.9	90.0
1979	953.3	227.7	73.2	100.2
1980	1,230.5	234.9	78.3	86.1
1981	1,194.0	216.6	81.5	121.3
1982	915.0	232.0	81.2	157.9
1983	1,001.1	252.1	84.8	112.2
1984	872.4	232.0	98.9	107.4
1985	988.3	209.8	78.8	102.4
1986	1,363.0	285.4	107.4	253.7
1987	1,511.0	314.9	160.3	302.4
1988	1,770.0	328.2	164.6	301.3
1989	2,256.0	361.2	185.9	314.8
1990	2,430.0	479.5	241.2	196.6
1991	2,474.0	529.7	320.2	384.7
1992	2,522.7	767.2	334.7	366.4
1993	2,117.0	918.7	359.4	390.4
1994	1,832.1	855.9	324.1	599.7
1995	1,890.8	516.6	348.8	442.1
1996	1,677.1	581.6	305.8	633.4
1997 ¹	1,366.5	629.3	211.6	675.6
1998 ¹	1,440.7	435.7	519.7	607.5

NOTE: See Table 1, page 13 for total construction.
Source: DBEDT, GSP Project
¹ Federal data includes both definite and potential projects listed in annual Construction Preview publications.



or five years. These factors will tend to moderate the amount of construction demanded in the future.

But while the construction industry is likely

to grow more slowly, it should also grow more consistently, with fewer wide swings in demand that play havoc with the industry. There will be occasional large projects but probably not a glut

of larger projects such as have triggered wide construction swings in the past.

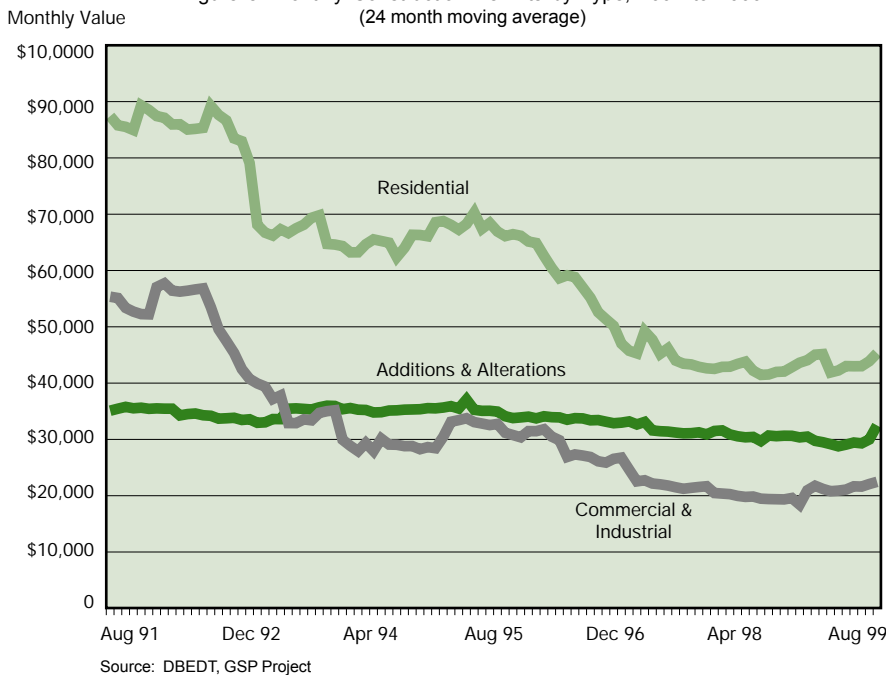
Over the next fifteen to twenty years, the factor that may have the most impact on construction is the demographic shift to an older population as the baby boom generation ages. For instance, it is expected that the population² in Hawaii over 55 years of age

continued on next page

Construction and Hawaii's Economy

continued from page 7

Figure 8. Monthly Construction Permits by Type, 1991 to 1999
(24 month moving average)



will account for 33 percent of the total in 2020, compared to just 22 percent in 1995. This shift will pose many challenges to all sectors of the economy including the construction industry. It is likely that construction demand will increasingly reflect the needs of this aging population, including housing and commercial facilities specifically designed with older consumers in mind. There will be growing demand for communities with medical, commercial and other service facilities integrated with the residential complexes. Transportation and other infrastructure will also need to reflect the needs of an aging population over the next several decades.

² Civilian population excluding military dependents.

20 Largest Hawaii Construction Projects During 1999

Project	Type	Value ¹ (\$millions)	County	Developer	Completion
Hawaiki Tower	Residential	99	Honolulu	Nauru PRD	June 1999
Moanalua Terrace Housing	Residential	88	Honolulu	U.S. Navy	July 1999
Ala Moana Center Phase V-A	Commercial	68	Honolulu	E/E Hawaii Joint Venture	September 1999
Federal Detention Center	Fed. Government	59	Honolulu	Federal Bureau of Prisons	November 2000
Consolidated Brac III (KMCBH)	Fed. Government	52	Honolulu	U.S. Navy	April 1999
Paawa Development	Residential	49	Honolulu	Waldron Ventures	May 1999
H-3 Finish (Unit II)	State Government	48	Honolulu	State of Hawaii	August 1999
Kapolei High School	Commercial	44	Honolulu	Makai Village Partners	April 2001
Kaniohale La'i'opua subdivision homes	Residential	37	Hawaii	Laiopua Joint Venture	April 2000
Bachelor Enlisted Quarters (KMCBH)	Residential	35	Honolulu	Marine Corps Base Hawaii	February 2000
Kapolei Middle School	Commercial	32	Honolulu	Makai Village Partners	June 1999
Ewa Marina/Ocean Point	Infrastructure	30	Honolulu	Haseko (Ewa) Inc.	June 1999
Honolulu TRACON expansion (Airport infrastructure)	Fed. Government	26	Honolulu	FAA	June 2001
Bachelor Enlisted Quarters (Pearl Harbor)	Residential	26	Honolulu	U.S. Navy	January 1999
Konawaena Elementary School (increments 1&2)	State Government	25	Hawaii	State of Hawaii	March 2000
Berthing Pier, Sub Base, Pearl Harbor	Fed. Government	25	Honolulu	U.S. Navy	June 1999
UH Hamilton Library, Phase III	State Government	23	Honolulu	State of Hawaii	August 2000
UH Agricultural Science Facilities, Phase III	State Government	22	Honolulu	State of Hawaii	August 1999
Kula Residence Lots, Unit 1, Water system improvements.	State Government	22	Maui	Dept. of Hawaiian Home Lands	October 1999
Pearl City Bus Facility	City Government	20	Honolulu	City & County of Honolulu	August 2001

¹ Project values represent the total cost from start to finish of each project rather than the cost of work done only in 1999.

Source: Book of Lists 2000, Pacific Business News, December 31, 1999.

Demographics and Construction

The long-term effects of population change are an important driver of construction activity.¹ The aging of the baby boom generation will certainly have an impact on construction. However, the members of the population who probably have the most impact on construction at any given time are those forming new households and families, roughly the 20-34 years-old age group.

Other things equal, increases in the share of the population in the household-formation years should increase new housing demand and provide a boost to Hawaii's construction industry. Studies of the impact of this group in the past suggest that it can also affect prices in the housing market. For instance, when the baby boomers entered the household-formation age during the 1970s, real housing prices rose dramatically.

Right now the 20- to 34-years age group is mostly occupied by the 'baby-busters'— the smaller group that followed the baby boomers. As shown in the figure below, this group currently represents less than 17 percent of the non-military-connected population in Hawaii.² However, as the children of the baby boomers (sometimes called the baby 'boomlet') move into the 20- to 34-years age group, it is going to experience substantial growth. DBEDT projections anticipate that the 20- to 34-years old group will increase 30 percent in

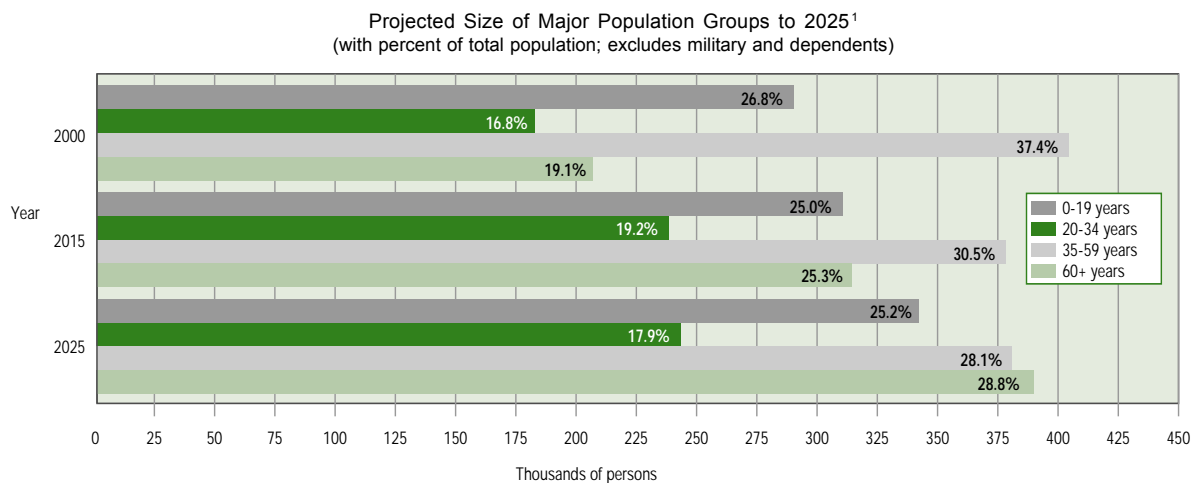
number from 2000 to 2015, more than twice the rate of increase than the non-military population as a whole. The group's share of the non-military population total will increase to more than 19 percent. Of the roughly 160,000 increase in residents during this period, the 20- to 34-years old group will account for more than one-third (56,000). Only the 60-years-and-over group will be growing faster (52 percent from 2000 to 2015).

However, as the chart indicates, growth for the 20- to 34-years group will slow to a trickle after 2015, as the bulk of the baby boomlet moves into the next age group. From 2015 to 2025 the 20- to 34-years old group will increase in number by only 2 percent and shrink back to 18 percent of the non-military population.

This suggests that residential housing demand could show substantial growth in the next decade and a half, despite relatively modest growth in the population overall. After that, new housing demand will gradually taper off as the size of this group stabilizes.

¹ Thanks to Professor Andrew Mason, Department of Economics, University of Hawaii (Manoa), for providing materials and advice on this topic.

² Resident population less military members and dependents.



¹ The updated, 2025 Economic and Population Projections report is available on the DBEDT website at www.hawaii.gov/dbedt/2025/
Source: DBEDT, Long-Range Projections Project, Economic and Population Projections to 2025.

A Timeline of Construction in Hawaii

1837 First public streets are laid out in Honolulu.

1849 One of the earliest residential subdivisions in the Islands is laid out in Honolulu in the area approximately bordered by the current streets of Alapai, Kinau, King and Punahou (Makiki Stream).

1860 Queen's Hospital opens its initial, 124-bed, coral stone building on Punchbowl Street in Honolulu.



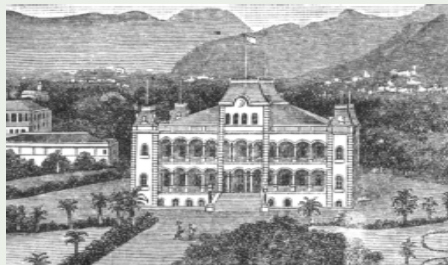
STATE ARCHIVES PHOTO

ABOUT 1910

1871 The Kamehameha V Post Office is completed at Bethel & Merchant streets in Honolulu. It is the first structure in Honolulu built largely of cement.

1876 Construction is completed on the Maui Hamakua-Haiku Ditch, built to supply irrigation water to Alexander & Baldwin's sugar lands.

1882 Iolani Palace is completed. The Palace features electric lights and telephones several years before such technology is available in the White House.



STATE ARCHIVES PHOTO

ABOUT 1885

1886 The Islands' first building permit requirements are imposed in the central Honolulu area between Kalihi and Manoa.

1892 Bernice Pauahi Bishop Museum opens.

1898 Construction of Pali Road is completed.



STATE DEPARTMENT OF TRANSPORTATION

ABOUT 1915

1899 Construction of Honolulu's first sewer system begins.

1901 Hawaii's first skyscraper, the six-story Stangenwald Building is completed on Richards Street in downtown Honolulu.

1901 The new Moana Hotel becomes Hawaii's first large resort hotel.



STATE ARCHIVES PHOTO

ABOUT 1905

1903 The Alexander Young is completed. At six stories it is Hawaii's first high-rise hotel.

1903 Completion of the Pacific Cable. This technological event breaks Hawaii's isolation by connecting it to the Mainland U.S. and the rest of the world. The cable is a mainstay of communications into the early 1950s when newer technology rendered it obsolete.

1906 Hawaiian Pineapple Company's Iwilei (Honolulu) cannery completed.

1910 The College of Hawaii Observatory, Hawaii's first astronomical observatory becomes operational in Honolulu's Kaimuki district, featuring a 6-inch telescope.

1916 The Waiahole ditch and tunnel system to transport water from the Koolau Mountains to the sugar lands of leeward Oahu is completed. The main trans-Koolau tunnel is 2.76 miles long.

1921 Reclamation of swampland in Waikiki begins, marking the beginning of its evolution into one of the world's premier resort destinations.

1926 Ten-story Aloha Tower is completed, reaching 184 feet, making it the tallest building in the State.



STATE DEPARTMENT OF TRANSPORTATION

1926 The Honolulu Stadium, Hawaii's first large sports stadium, opens in Honolulu's Mōiiliili District. Years later the wooden structure would become affectionately known as the Termite Palace.

1927 John Rodgers Airport in Honolulu is completed, later to become the Honolulu International Airport.

1927 The Royal Hawaiian Hotel opens in Waikiki.

1927 The Hawaiian Pineapple Company adds a 199-foot water tower to its Iwilei cannery, shaped and decorated in the form of a giant pineapple.

1927 Natatorium War Memorial opens.



STATE ARCHIVES PHOTO

1940 Kamehameha Homes, the first public housing project in Hawaii is built by Hawaii Housing Authority near Farrington High School in Kalihi (Honolulu).

1942 Military fuel storage tanks built 450 feet under Red Hill between Honolulu and Pearl Harbor. Twenty tanks, each measuring 250 feet tall by 100 feet in diameter (larger than Aloha Tower) are hollowed out of solid rock under the hill. Site is on the list of National Historic Civil Engineering Landmarks.

1947 Aloha Shopping Center opens on Farrington Highway in Waipahu, the first planned integrated shopping center in Hawaii.

1948 Tripler Army Hospital is completed (fourteen stories, 189 feet).

1951 First tunnel constructed on a public highway in Hawaii is built as part of the Lahaina-Wailuku Road on Maui (286 ft. long).

1953 First freeway constructed in Hawaii is the Mauka Arterial through central Honolulu. It later became known as the Lunalilo Freeway and eventually part of the H-1 Freeway.

1956 Mees Solar Observatory is constructed on the summit of Maui's Haleakala.

1957 Hawaiian Village Hotel in Waikiki builds one of the world's first geodesic domes as an auditorium. Structure is demolished in 1999 to make way for hotel expansion.

1959 Nuuanu Pali Tunnels of the new Pali Highway are completed.

1959 Ala Moana Shopping Center opens in Honolulu.



ALA MOANA CENTER WEBSITE Site was coral fill before construction.

1960 Wilson Tunnel completed as part of the Likeli Highway linking Honolulu and Kaneohe.

1961 First condominium project in Hawaii is approved; a 12-story apartment structure on Kalakaua Avenue.

1961 The La Ronde revolving restaurant is completed atop the Ala Moana Building next to the Ala Moana Shopping Center.

1962 Sheraton Maui Kaanapali Beach Resort opens, beginning the West Maui resort investment era.

1964 An \$84 million undersea cable between Hawaii and Tokyo is put into operation.

1965 Laurance Rockefeller's Mauna Kea Beach Resort opens on the South Kohala Coast of the Big Island, the beginning of the South Kohala, North Kona resort investment era.

1969 University of Hawaii initiates the age of astronomy on the Big Island's Mauna Kea with a 24 inch (.6m) optical telescope facility.

1969 The Hawaii State Capitol building is completed.

1974 Construction of H-3 Freeway linking Kaneohe to Pearl Harbor is begun.

1975 Aloha Stadium (50,000 seats, costing \$32 million) opens in Halawa, Oahu near Pearl Harbor.

1976 First geothermal well in Hawaii (named HGP-A) produces steam. The 6,140 feet deep well in the Big Island's Puna district is found to be among the hottest in the world and six years later begins powering a 3-megawatt electric generating plant.

1977 The \$80 million reef runway at the Honolulu Airport is completed.



STATE DEPARTMENT OF TRANSPORTATION

1979 The world's first at-sea Ocean Thermal Energy Conversion (OTEC) plant is operational off of Keahole Point, Kona on the Big Island.

1979 The first all light gauge steel frame residential structures (ten housing units), are built by Galante Construction for Hawaii Housing Authority.



Recent steel frame project

SAM GALANTE

1991 W.M. Keck I optical/infrared telescope became operational on Mauna Kea.

1996 The world's most powerful telescope to date, the W.M. Keck II, 10 meter optical/infrared facility is completed at the University of Hawaii's Mauna Kea Science Reserve.



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1996 Hawaii's tallest building and first to exceed 400 feet, the First Hawaiian Center is completed (438 ft.).

FIRST HAWAIIAN BANK

1997 H-3 Freeway opens after more than 20 years.



STATE DEPARTMENT OF TRANSPORTATION

1997 Hawaii Convention Center completed on the west edge of Waikiki.



CONVENTION CENTER AUTHORITY

1999

1998 The 4,700 foot, \$78 million Ford Island Bridge is completed, providing the first highway link to the Island.

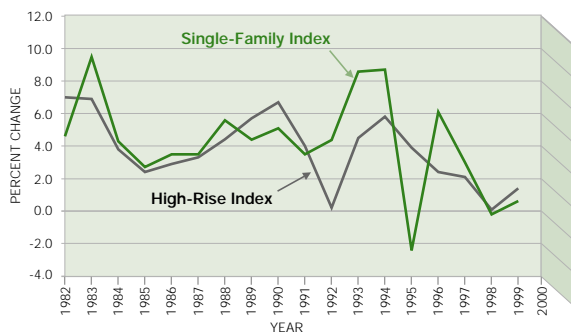
2000 (under construction) The Smithsonian/Taiwan 8 meter submillimeter Array Observatory will become the 13th facility in the Mauna Kea Science Park.

The Honolulu Construction Cost Indexes

The Honolulu Construction Cost indexes were initially developed in 1947 by the former publication *Builders Report Pacific* (BRP). When BRP stopped compiling the indexes in 1969, they were adopted first by the Economic Research Division of First Hawaiian Bank and then by DBEDT in late 1997, following the closing of the Bank's Research Department. The estimates have been published in DBEDT's *Quarterly Statistical & Economic Report* and the *State of Hawaii Data Book 1998*.¹ The construction cost indexes are designed to measure costs to contractors of typical building materials and public-contract labor. However, they do not include the costs of contract overhead and profit, site preparation, utilities-installation, and overtime labor.

The Indexes estimate the current-cost of materials and labor for each of the following two types of common construction:

Honolulu Construction Cost Indexes
(annual percent changes)



- A single-family residence of about 1,300 square feet with a concrete slab floor. The single-family index is based on eight specific major items for this type of structure including lumber, roofing shingles, cement, copper pipe, electrical wire, drywall, glass, and paint. The average wage of ten major construction labor groups make up the labor component of the index, including carpenters, electricians, laborers I & III, lathers, masons, painters, plasterers, plumbers, and roofers.
- A high-rise condominium or office-type structure includes most of the materials and labor components as in the single family, although with some additions and in different proportions. The high-rise index also includes reinforcing steel and five additional labor groups — boilermaker, tilesetter, structural and reinforcing ironworkers, and heavy equipment operator.

The labor and materials components are weighted for each type of construction according to average amount of the item used in that type of construction. The base for these two indexes is now January 1992=100.

As the accompanying chart indicates, increases in construction costs appear to bear some relationship to the peaks and valleys of construction activity. Both high-rise and single family construction costs slowed markedly during the early 1980s slump in activity and accelerated in the boom period of the late 1980s. Prices peaked in the early 1990s and the trend has been towards slower increases ever since. Since most of the materials for construction are imported from the Mainland, price trends nationally will also have some impact on the indexes.

Single-family and high-rise construction costs have generally moved together except for the early 1990s when single-family price increases exceeded high-rise prices in most years. Over the past two years construction cost increases have been under 2 percent per year for both the high-rise and single family indexes.

¹ Both of these publications are available from the DBEDT web site: www.hawaii.gov/dbedt/stats.html.

Honolulu Construction Cost Indexes
(January 1992=100)

Year	Index Values		Annual percent change	
	High-Rise	Single-Fam.	High-Rise	Single-Fam.
1982	67.1	65.3	7.0	4.6
1983	71.7	71.5	6.9	9.5
1984	74.4	74.6	3.8	4.3
1985	76.2	76.6	2.4	2.7
1986	78.4	79.3	2.9	3.5
1987	81.0	82.1	3.3	3.5
1988	84.6	86.7	4.4	5.6
1989	89.4	90.5	5.7	4.4
1990	95.4	95.1	6.7	5.1
1991	99.2	98.4	4.0	3.5
1992	99.4	102.7	0.2	4.4
1993	103.9	111.5	4.5	8.6
1994	109.9	121.2	5.8	8.7
1995	114.1	118.2	3.9	-2.4
1996	116.9	125.5	2.4	6.1
1997	119.3	129.3	2.1	3.0
1998	119.4	129.0	0.1	-0.2
1999p	121.0	129.8	1.4	0.6

Source: DBEDT, Honolulu Construction Cost Indexes Project.

p – preliminary

One of the primary purposes of construction activity is to build facilities that will enable other industries to add value to the economy. But construction also adds its own value to the economy by providing jobs and buying materials and equipment in order to build these facilities. Despite the decline in construction over the past eight years, the current annual rate of about \$3 billion in expenditures represents an important source of economic stimulus to the economy. It amounts to the third largest source of economic stimulus next to the \$10 billion visitor industry and the roughly \$3.4 billion dollars in Federal activity.

There are several ways of gauging construction's role in State's economy. One of the ways is to look at the total value of construction during a given year. This is certainly a useful figure for tracking the ups and downs of construction activity. But it is difficult to say from an industry's sales total how much the activity actually contributed to the economy. For instance retail industry sales in the state may total \$16 billion in a given year. However, most of this value is represented by products that simply passed through the retail sector on their way from the producer to the consumer.

A more economically useful way of measuring construction's impact is to estimate the industry's contribution to Gross State Product (GSP). This measure is more useful because the contribution to GSP can be compared among industries, showing their relative importance to the economy.

Another useful measure of construc-

Construction's Impact on the Economy

tion's role in the economy is how much activity the construction dollar creates in other industries as it is re-spent in the local economy. This measure helps show the overall impact that the construction dollar has on the economy and how much other industries and jobs *depend* on construction activity.

Construction and Gross State Product

Construction spending in Hawaii is component of GSP. However the construction *industry's* contribution to GSP is *not* as great as the total value of construction put in place. This is because a number of industries besides construction share in the credit for the value of total construction in a given year. For example, much of the value of construction is made up of materials, such as concrete and lumber, which were largely imported or produced by firms in Hawaii's manufacturing industry. Construction also uses a considerable amount of energy, which was produced by the utilities industry and energy firms in the manufacturing sector.

When these inputs from other industries in Hawaii and materials imported from outside the state are subtracted out of total construction expenditures, the result is a measure of the value added to Gross State Product by the construction industry. Table 1 and Figure 1

show that the construction industry can take credit for roughly half of the total value of construction as measured in GSP.

Even after accounting for the contribution of other sectors of the economy, the construction industry has amounted to a sizable portion of GSP over the years — as high as 8.2 percent in 1970. Today, of

course, with construction hopefully just past the bottom of its latest cycle, the contribution to GSP is considerably smaller. In 1998 that proportion was estimated to have been about 4 percent.

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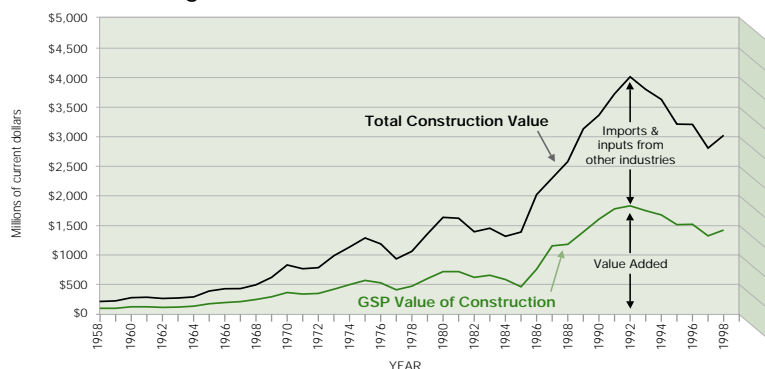
Table 1. Value of construction, 1958 to 1998 (millions of current dollars)

Year	Total Value		Construc. Share of GSP
	Total Dollar Value	Gross State Product Value ¹	
1958	212.7	95.1	7%
1959	224.1	100.2	6%
1960	279.5	124.9	7%
1961	284.2	127.0	7%
1962	265.1	118.5	6%
1963	269.2	120.3	6%
1964	294.4	131.6	6%
1965	388.3	173.5	7%
1966	424.1	197.9	7%
1967	430.6	208.1	7%
1968	491.6	245.8	7%
1969	617.1	290.0	7%
1970	827.4	363.8	8%
1971	763.5	336.1	7%
1972	782.0	344.1	6%
1973	980.9	422.9	7%
1974	1,134.8	504.4	7%
1975	1,281.0	565.0	8%
1976	1,181.0	524.9	7%
1977	930.5	408.7	5%
1978	1,063.7	470.9	5%
1979	1,354.4	598.6	5%
1980	1,629.8	718.6	6%
1981	1,613.4	713.2	5%
1982	1,386.1	618.2	5%
1983	1,450.2	652.6	4%
1984	1,310.6	582.5	4%
1985	1,379.3	459.8	3%
1986	2,009.5	753.6	4%
1987	2,288.6	1,144.3	6%
1988	2,564.1	1,172.2	5%
1989	3,117.9	1,385.7	6%
1990	3,347.3	1,600.9	6%
1991	3,708.6	1,773.7	6%
1992	3,991.0	1,829.2	6%
1993	3,785.5	1,738.2	6%
1994	3,611.8	1,673.3	5%
1995	3,198.3	1,505.1	5%
1996	3,197.9	1,506.2	4%
1997	2,883.0	1,357.9	4%
1998	3,003.6	1,414.7	4%

Source: DBEDT, GSP Project

¹ The GSP value of an industry excludes the industry's inputs from other industries and its direct imports

Figure 1. Construction, Total vs. GSP Value



Source: DBEDT, Input-Output Modeling Project

Construction Wages

Average annual construction wages grew at a slower rate than wages in nearly all other major industries during the 1990 to 1997 period. This is not surprising given the sharp decline in activity for the industry. Average annual wages are calculated as the total wage and salary income for an industry for the year, divided by the average number of wage and salary employees in the year.

In contrast to total wages, the prevailing hourly wage and benefit rate for the construction trade groups increased substantially more than average income earned in the industry. The prevailing wage rate is the hourly rate required to be paid to workers on State and Federal construction projects. It is closely linked to increases in negotiated trade union rates. DBEDT's Honolulu Construction Cost Indexes show that the increase in the average prevailing wage rate between 1990 and 1997 was 33 percent for the single-family construction trades and 36 percent for the high-rise construction trades. The difference in these two

measures may be explained by fewer days worked per year by construction industry employees as the downturn worsened. There also may have been more work performed below the prevailing wage rate on private sector projects. The prevailing wage rate may have continued to increase as the result of agreements negotiated before the severity of the downturn became apparent.

Average wages and salaries in construction have been generally among highest in the economy over the past 20 years. As the table below indicates, construction has consistently topped the major industries in terms of average wage earnings. The gap between construction and the all-industry average was highest during the peak of the late 1990's building boom. The difference narrowed only slightly through the decline in construction activity in the 1990s, despite the loss of about a third of all construction jobs.

Measures of Income and Wages for Construction and Other Workers (dollars & percent)							
Industry	1980	1985	1990	1995	1997	Percent Change	
						1980-90	1990-97
Average all industries	13,405	17,542	23,330	27,043	28,228	74.0%	21.0%
Construction	20,069	26,917	36,201	41,779	42,397	80.4%	17.1%
As % of all industry average	149.7%	153.4%	155.5%	154.4%	150.2%	—	—
Other Major Industries							
Farm wage and salary workers	11,238	15,014	17,028	20,673	20,188	51.5%	18.6%
Manufacturing	14,410	19,089	25,197	29,636	31,006	74.9%	23.1%
Transportation and utilities	19,243	23,131	28,656	33,375	35,951	48.9%	25.5%
Retail trade	8,749	11,005	15,037	17,156	17,562	71.9%	16.8%
Finance, insur. and real estate	13,792	18,944	27,721	31,777	34,585	101.0%	24.8%
Services	11,604	16,117	22,496	26,403	27,423	93.9%	21.9%
Government	14,860	19,871	24,651	29,210	30,893	65.9%	25.3%

Source: DBEDT, data from U.S. Bureau of Economic Analysis

Construction's Impact on the Economy

continued from page 13

The Economic Impact of Construction

In GSP terms, the construction industry shares credit with other industries for the value of total construction put in place. However, construction is financed by money that flows through the construction industry first and then to the other contributing industries. Thus, the construction industry can be viewed as *supporting* a portion of the income and jobs in other industries.

The degree to which other industries depend on the construction industry is a very useful thing to know about. It can tell us, for instance, how many jobs and how much sales activity will be generated in other industries for every new dollar of expenditure in the construction industry. Likewise, it can tell us what the loss in jobs and sales might be when construction expenditures decline.

As part of its economic modeling program, DBEDT has developed estimates of the impact construction expenditures have on other industries in the economy.¹ Figure 2 shows how \$1 billion in additional construction expenditures creates additional or *indirect* economic activity in addition to the *direct* economic activity in the construction industry itself. The table shows that a billion dollars in *direct* construction spending actually generates, on average, about \$1.3 billion of total output in the economy, more than 12,400 jobs and \$583 million in

household income in Hawaii.² The lower boxes in Figure 2 show how this economic activity was distributed among the key industries that provide inputs into the construction sector. Not surprisingly, most of the output, jobs and income from construction spending were generated in the construction industry itself. But activity was also generated in related industries such as real estate, engineering and banking. Moreover, activity was also generated in industries seemingly unrelated to construction such as medical care, eating and drinking and retailing.

Table 2 shows that the type of construction activity is a factor in the impact construction will have on the rest of the economy. For instance, road construction has the greatest impact on overall output and income created in the economy. However, multi-family construction has the greatest impact on jobs, creating six additional jobs in the economy for every 10 jobs in multi-family construction.

Beyond the direct and indirect effects of construction activity there are even more impacts on the economy generated as the workers in the construction and related industries re-spend their income in the community. These are called *induced* impacts. There are also impacts on the productivity of the economy as construction updates the capital stock with more and better facilities. These impacts are more long term

and difficult to predict or measure.

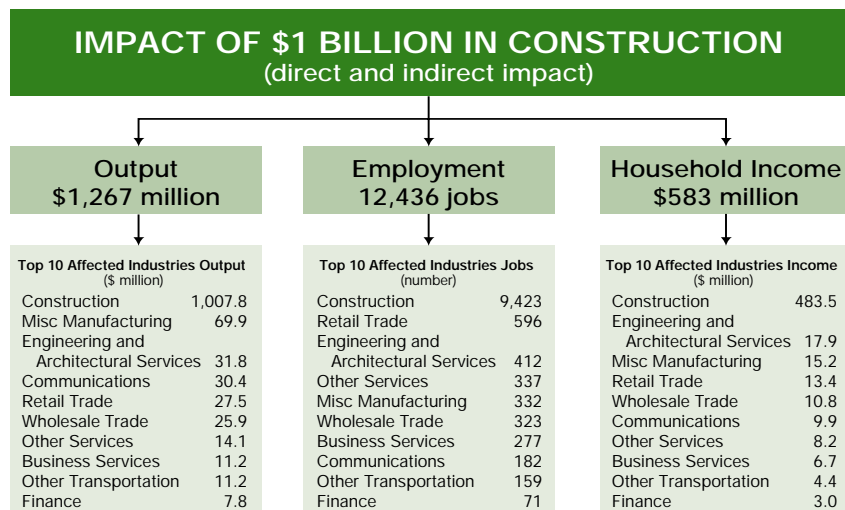
Conclusions

These economic impact estimates show that construction activity reaches deep into the community in terms of jobs and income. New projects create employment and business opportunity in many other industries beside construction. Likewise, a decline in construction projects can reduce employment and income in other industries. Thus, efforts to stabilize construction activity not only benefit the industry and its workers, but also the thousands of other jobs and millions of dollars of income and business activity that depend indirectly on construction spending.

¹ The model used in this case is called the Hawaii Input-Output Model, which measures the relationship of an industry in the local economy to every other industry.

² The term output used here is defined as the value of sales for most industries and "trade margins" for a few industries such as retail and wholesale trade, which do not actually make the goods they sell.

Figure 2. Estimated Impact of Construction on Economy in the Year 2000



Source: DBEDT, Input-Output Project.

Table 2. Construction's Impact by Type of Project (Based on \$1 billion investment in 2000)			
Industry	Direct	Indirect	Direct & Indirect
Single-Family Construction			
Output (\$ million)	1,000	270	1,270
Employment (Total Jobs)	7,251	3,286	10,537
Household Income (\$ million)	477	113	590
Multi-Family Construction			
Output (\$ million)	1,000	270	1,270
Employment (Total Jobs)	5,310	3,275	8,585
Household Income (\$ million)	451	109	560
New Industrial & Commercial Buildings			
Output (\$ million)	1,000	280	1,280
Employment (Total Jobs)	10,046	3,241	13,287
Household Income (\$ million)	452	118	570
Hotel Construction			
Output (\$ million)	1,000	290	1,290
Employment (Total Jobs)	8,598	3,213	11,811
Household Income (\$ million)	438	122	560
Road Construction			
Output (\$ million)	1,000	340	1,340
Employment (Total Jobs)	9,768	3,510	13,278
Household Income (\$ million)	483	147	630
Other Construction			
Output (\$ million)	1,000	290	1,290
Employment (Total Jobs)	9,766	3,582	13,348
Household Income (\$ million)	453	137	590

Source: DBEDT, Input-Output Project.

The chart on page 3 shows that Hawaii's construction industry has experienced three major boom-bust periods since statehood, the first in the mid 1970s, the second in the early 1980s and the last from the late 1980s through most of the 1990s.

Why does construction seem to have such extreme ups and downs? What has been or can be done to reduce the volatility?

Two things are clear from the discussions in earlier articles in this report. First, construction cycles in Hawaii's post-statehood era have been very painful for the workforce and firms in the industry. In the latest cycle more than 12,000 construction jobs were lost from 1991 to the bottom in 1999. The social costs of these losses may be even more severe than the economic costs.

Secondly, it is also clear from the economic impact article that construction has a significant impact on the rest of the economy. Roughly, for every three jobs lost or gained in the construction industry another job is maybe lost or gained in the rest of the economy. So it matters to the rest of the economy what happens to the construction industry.

What are the options for addressing the volatility in construction? To shed some light on this question, it helps to understand how construction and the investment cycle affect Hawaii's economy.

The Investment/Construction Cycle

Many observers look to the mid-to late-1980s as their reference point for

Taming the Construction Cycle

Hawaii's most recent construction cycle. At that time, Japan's booming economy generated high incomes and wealth and the Japanese were encouraged by their government to help even-out the country's growing balance-of-trade surplus by taking vacations outside Japan.

Hawaii was a beneficiary of these events. As shown in Figure 1, visitor arrivals surged in the second half of the 1980s. This increased demand for hotels, restaurants, and recreational facilities, particularly golf courses. In addition, Japanese firms and individuals were investing in Hawaii's real-estate market and businesses.

This surge in demand put upward pressure on prices for a wide range of goods and services in Hawaii, particularly housing. An increase in the level of demand in the economy stimulates the investment sector to build more long-term capacity (hotels, restaurants, homes, etc.). This investment activity adds to the overall demand for goods and services and helps generate a surge in income and employment throughout the economy.

The panels in Figure 2 indicate that Hawaii followed the typical investment-disinvestment scenario very closely. The first panel of Figure 2 shows that the surge in investment reached a peak in 1987, at a level more than double the previous peak. As a result, income

as measured by GSP also surged (panel 3). Total gross state product in the

State would have grown even without the additional investment due to the increase in tourism demand. But investment added more fuel to the fire.

Unfortunately for Hawaii, the surge in tourism proved to be temporary. The U.S. economy slipped into recession in the early 1990s, followed by Japan's economy a few years later. As Figure 1 shows, this caused the demand for Hawaii's tourism services to fall beginning in the early 1990s.

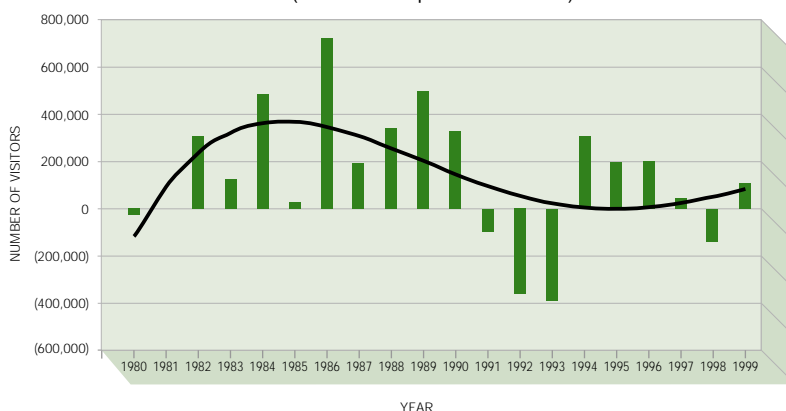
But more importantly for the long-term, the total capital stock resulting from the investment boom in the late 1980s and early 1990s proved to be too high. With the fall-off in tourism demand, there was more hotel room inventory, office space and housing coming on line than could be absorbed. As shown in Panel 1 of Figure 2, this overbuilding resulted in a period of negative investment in which the value of the capital stock (panel 2) actually declined. Hawaii's economy had to endure a long period of *disinvestment* to bring the capital stock back into line with the more modest demand.

Stabilizing the Cycle

So what can be done to avoid costly boom-bust investment cycles? At the national level there are a number of stabilizing influences and policy tools to discourage boom-bust cycles. In most past U.S. investment cycles, the boom period has been somewhat limited by the supply of national savings. After all, investment activity is carried on by funds borrowed from savers. There is only so much saving available per year in the economy and as the demand to borrow that saving increases, interest rates rise and put a damper on investment activity. This automatic stabilizing factor has been compromised in more recent years with the increasing deregulation of international financial markets. Now foreign economies like Japan can supply large amounts of savings to other economies and keep other nations' boom periods going even when domestic savings run short.

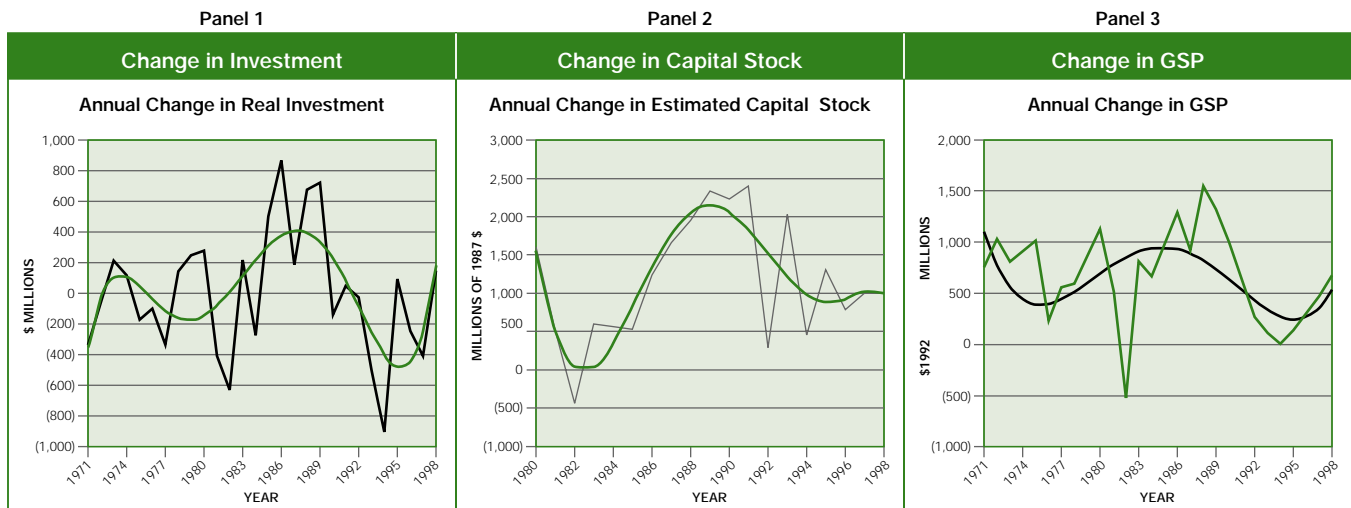
The Federal government through the

Figure 1. Annual Change in Number of Visitors
(Smooth line represents the trend)



Source: DBEDT

Figure 2. Hawaii's Investment Cycles
(Smooth line represents the trend)



Source: DBEDT

Federal Reserve System can also control the money supply and interest rates. If the economy begins to grow faster than the Federal Reserve Board of Governors determines is sustainable, it can preempt a boom-bust cycle by forcing interest rates up before the investment boom can overheat the economy.

Finally, the Federal government also has the power of fiscal policy. It can slow or encourage demand by changing tax rates and by its willingness to accelerate or slow government spending in the economy.

State Policy Options

Unfortunately, most of these Federal level options are not viable for state governments. First of all, there is no automatic constraint on investment at the state level. This is because even without foreign investment, there is a large pool of national savings available at any given time to supply a high-growth state's investment needs. Secondly, states have no control over interest rates. Finally, while tax policy is a potential tool for state governments, the level of taxation at the state level is relatively modest compared to the Federal level. Moreover, a consensus on changing tax rates can be difficult and time consuming to achieve, making it a cumbersome tool for affecting short-range business and investment cycle problems.

Public Investment

One tool available to state governments that does have potential is budgetary policy. State

and local governments spend large amounts of funds on public facilities and infrastructure. It is often suggested that the public sector may be able to "lean against the wind" during the business cycle. This means that in a booming economy, the government could refrain from adding further fuel to the economic fires by postponing capital improvement projects where possible. Conversely, as the economy slips in to recession, the government could roll out new projects and "prime the pump." In this way, government could help smooth the peaks and valleys of the business cycle and keep the economy on an even keel.

But there are some difficult problems here. First, public and private investments are often complementary—they need each other. For example, a private housing development often requires corresponding public investments in schools, roads, sewers, and so on. Thus, a strong connection exists between private and public investment that makes "leaning against the wind" difficult.

Second, there are limits to the amount of public investment state and county governments can undertake at any given time. There are limits on the internal resources, primarily staffing, available to effectively administer and monitor an extensive number of construction projects. Even more important, state and local governments can borrow only so much at a time from capital markets in order to finance investment. These financial limits involve

government credit ratings and the interest costs of financing public investment. As with private borrowers, beyond a certain level, state and local governments simply cannot undertake additional investment without paying exorbitantly high interest and accepting a lower credit rating on debt.

Even if all of these problems could be overcome, there is still a very large hurdle left. It may take many months to identify a true construction downturn from random or minor economic fluctuations in the data. Moreover, large public construction projects must be submitted for legislative approval, bid out and detailed construction plans and schedules prepared. This process alone can take two years or more. So it could be two to three years after the beginning of a downturn before the public sector could mount a capital improvements "counter attack." By then the cycle may well have reversed.

In spite of these difficulties, the State in 1995 found itself in the position of having a backlog of approved, planned and financed projects that could be put on line fairly rapidly. This was done and over a period of several years, state projects provided an important buffer to the recession. Even so, the increase in projects could not arrest the decline in overall construction. The loss of private sector activity was too great.

Economists who have studied this problem in the past have suggested that

continued on next page

Taming the Construction Cycle

continued from page 17

the best strategy for government is to maintain a steady stream of projects throughout the construction cycle. This would tend to keep the public sector's contribution to the growth phase of the cycle modest, while providing some cushion on the downside.

Information and Education

Another possible tool for government and the private sector to help avoid extreme swings in construction activity is information and education. Economic forecasts and leading indicator data produced by the state and some private agencies are valuable tools in judging future demand and how permanent that demand might be. In addition, construction statistics and project information can help determine when the pace of investment and construction are excessive compared with expected demand.

Of course, for this effort to work the agencies must publicize the data, the media publish the information and the investment and financial sectors monitor and act on the information. The emerging technology of the information age is making it easier to produce and monitor this information. Web-based delivery of information, such as the newly created DBEDT construction web site, make it much easier for the industry, public and media to access the information and make it part of the decision-making process.

Construction and Hawaii's New Economy

Of course, instead of developing "counter cyclical" measures to help construction, it would be better not to have cycles at all. Unfortunately there will probably always be investment construction cycles. Even in a steadily growing economy there will be periods when large new capital investment will need to be made. This investment will be made in a "lump," like a major new hotel or office building, which will then be used up over a long period of time. These projects will stimulate temporary demand, which will stimulate income and may trigger a secondary investment wave, some overbuilding and ultimately a downturn later on.

However, as Hawaii's economy continues its transition into the economy of the 21st century, the sharp swings in demand that triggered large investment swings in Hawaii's post Statehood boom may begin to moderate. More modest tourism growth in the future should mean more consistent and less frenzied construction activity to meet the demands of this industry.

Also, tourism is beginning to diversify into many specialty niche markets and new economic sectors are emerging such as technology, health/medicine, specialty agriculture and others. Over the past 40 years the swings in tourism have dominated the level of demand and stimulated or

depressed investment. In the future, a wide variety of moderately sized industries and specialized tourism niche markets may have independent spurts of growth and occasional contractions. Smaller cycles in many industries are more likely to counter balance one another, leaving a more stable economy on average.

Conclusion

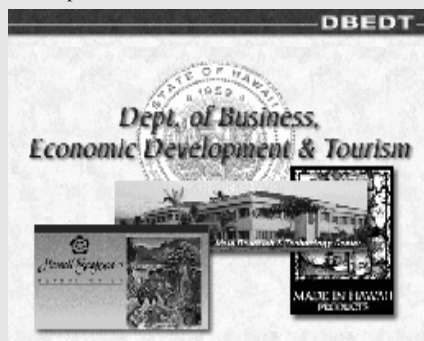
Much of the severe cyclical behavior of construction in the past has been linked to the high rate of growth in the post-statehood period and the tendency of investment to overreact to both increases and decreases in economic activity. Government can help cushion the cycle if planned projects can be either delayed or accelerated. Otherwise, a steady stream of government projects provides the most stabilizing response. More information and education about the economy and construction may help encourage investment decisions more appropriate for long-run stability.

There is some hope that future construction cycles will be less severe. This will be the case as long-run tourism growth slows and emerging, diversified industries begin to contribute more and more to overall economic growth.

Have you checked out DBEDT's web site lately?

There are loads of new data and reports ranging from new business contacts to the new economy

Examples of what's available



A New Millennium Growth Strategy for Hawaii
<http://www.hawaii.gov/dbedt/millennium/index.html>
Latest Economic Trends and Outlook
<http://www.hawaii.gov/dbedt/outlook/index.html>
State of Hawaii Data Book
<http://www.hawaii.gov/dbedt/db98/index.html>
DBEDT Quarterly Economic Forecast
<http://www.hawaii.gov/dbedt/forecast.html>
Selected Economic Activities
<http://www.hawaii.gov/dbedt/sea.html>
Quarterly Statistical and Economic Report
<http://www.hawaii.gov/dbedt/qsr0300/index.html>
Census reports from DBEDT's Hawaii State Data Center
<http://www.hawaii.gov/dbedt/sdcrpt.html>

Hawaii Economic and Population Projections to 2025
<http://www.hawaii.gov/dbedt/gaming/2025/>
Hawaii's Emerging Technology Industry
<http://www.hawaii.gov/dbedt/he1-00/index.html>
Tourism Looks to the Future
<http://www.hawaii.gov/dbedt/he7-99/index.html>
Education and the Economy
<http://www.hawaii.gov/dbedt/he11-98/index.html>
Hawaii's Retailing Revolution
<http://www.hawaii.gov/dbedt/he8-98/index.html>
Investing in Hawaii
<http://www.hawaii.gov/dbedt/invest.html>
Hawaii Products
<http://hawaii-products.com/>
Film & Television Production in Hawaii
<http://film-hawaii.com/>
Hawaii's Foreign-Trade Zone
<http://www.hawaii.gov/dbedt/ftz/index.html>

State of the Economy

Economic activity in Hawaii expanded in 1999. Employment and the number of jobs rose while unemployment continued to fall. The average daily visitor census (a combination of arrivals and lengths of stay) rose, as did total State tax collections. Selected data on Hawaii's economy appear in the table on page 20.

Civilian employment increased by 1.2 percent in 1999 from the year before. The number of wage and salary jobs increased a slight 0.1 percent for the year, but appeared to be gaining momentum in the last half of 1999. The movement of wage and salary job growth into positive territory is another signal of reviving economic activity. The number of unemployed declined 11 percent in 1999 and the unemployment rate dropped from 6.2 percent in 1998 to 5.5 percent last year.

More than 6.8 million visitors arrived in Hawaii over 1999, a 1.6 percent increase from 1998. Since the average length of stay also increased, the average daily visitor census rose by 2.1 percent over the period. Total tax revenues increased a slight 0.4 percent in calendar year 1999. The low growth was mainly due the phase-in of lower personal income tax rates that began in January 1999. The number of bankruptcy filings fell by 6.9 percent in 1999, the first yearly decline in this indicator since 1990.

DBEDT's Leading Economic Indicator (LEI) rose for the tenth consecutive month in January, the latest month for which the index can be calculated. The January rise marked the seventh consecutive record month since the LEI's start in 1992. The LEI's continued expansion in December suggests that Hawaii's economy is breaking out of the slow growth pattern experienced in the

Selected On-Line Construction Links and Resources

Source Internet	Address
State Resources and Information	
DBEDT Construction Industry Page	www.hawaii.gov/dbedt/build/state.html
State & County Public Notices	www.midweek.com/hscpn/
Dept. of Accounting & General Services	
State Procurement Office	www.state.hi.us/icsd/dags/spo.html
Public Works Division	www.state.hi.us/dags/publicworksdiv/
Hawaii Department of Transportation	www.hawaii.gov/dot/business.htm
University of Hawaii Procurement Information	www.hawaii.edu/svpa/apm/a8200.html
Federal Information and Resources	
SBA Pro net	pro-net.sba.gov/
Commerce Business Daily	cbdnet.access.gpo.gov/
Federal Electronic Posting System (EPS)	www.eps.gov/
Fed Central Contractors Registration	www.ccr2000.com/
Army Corps of Engineers – Hawaii District	www.poh.usace.army.mil/pohct/
Doing Business with the DOD	www.defenselink.mil/other_info/business.html
County Information and Resources	
C&C of Honolulu, Div. Of Purchasing	www.co.honolulu.hi.us/pur/
Hawaii County Bid Status	www.hawaii-county.com/purchasing/bids.htm
Hawaii County Building Permits	www.hawaii-county.com/permits/permits.htm
Kauai Dept of Public Works	www.kauaigov.org/publicworks.html
Kauai Dept of Public Works Building Div.	www.kauaigov.org/building.html
Maui County Purchasing Division	www.co.maui.hi.us/departments/finance/welcome.html
Associations and Organizations	
Chamber of Commerce of Hawaii	www.cochawaii.com/
Building Industry Association of Hawaii	www.bia-hawaii.com/
Associated Builders and Contractors – Hawaii Chapter	www.abc.org/hawaii
National Contract Management Association – Aloha Chapter	www.aloha.net/~leek
Pacific Resource Partnership	www.prp-hawaii.com/
National Association of Home Builders	www.nahb.com/
Women Construction Owners & Executives, USA	www.wcoeusa.org/
Other Information Resources	
Home Building and remodeling Network	www.hbrnet.com/
Builder Online	builder.hw.net/frmHomePage/
Building Innovation & Construction Technology (Australian web magazine)	www.dbce.csiro.au/inno-web/
Emerging Construction Technologies	www.new-technologies.org/ECT/
Construction Education Connection	www.constructioneducation.com
Construction Industry Institute (Texas)	construction-institute.org/
Construction Industry Computing Association (UK)	www.cica.org.uk/
Other Useful Links	www.hawaii.gov/dbedt/build/links.html

NOTE: These links were active as of April 2000.

1990s. The performance of the index over the last several months suggests a sustained period of higher economic activity for Hawaii.

A more thorough review of Hawaii's recent economic performance is available on the internet at www.hawaii.gov/dbedt/latest.html.

Selected Economic Indicators: State

Series	Period (calendar year basis except for taxes)			Percent change from same period of previous year		
	1998	1999	Jan. 2000	1998	1999	Jan. 2000
Civilian Labor Force (persons) ¹	597,050	599,500	602,250	0.1	0.4	0.3
Civilian Employment	559,750	566,300	572,950	0.2	1.2	1.5
Civilian Unemployment	37,300	33,200	29,250	-2.4	11.0	-19.3
Unemployment Rate (percent) ²	6.2	5.5	4.9	-0.2	-0.7	-1.1
Total Wage & Salary Jobs	537,550	537,950	540,100	-0.2	0.1	1.5
Taxes (\$thousands, state fiscal year ³)						
Total State Tax Collections	3,334,306	3,346,691	375,441	1.9	0.4	21.5
State General Fund Tax Revenues ⁴	2,849,184	2,854,165	335,223	2.8	0.2	21.2
Selected Taxes						
Transit Accommodations Tax Revenue	127,076	136,533	14,195	1.3	7.4	90.7
General Excise & Use Tax	1,425,352	1,447,278	155,041	-2.2	1.5	43.5
Personal Income Tax Collections	1,083,651	1,068,711	150,656	11.0	-1.4	8.3
Corporate Income Tax Collections	46,209	42,643	6,399	-20.1	-7.7	1.0
Visitor Arrivals by air (persons)	6,738,220	6,848,500	516,344	-2.0	1.6	-3.7
Domestic Visitors	(NA)	(NA)	312,574	(NA)	(NA)	-2.3
International Visitors	(NA)	(NA)	203,770	(NA)	(NA)	-5.7
Average Daily Visitor Census	159,890	163,190	173,978	1.1	2.1	-5.0
Hotel Occupancy Rates (percent) ²	71.5	72.1	68.2	-2.4	0.6	-3.6

¹ Labor force and jobs averages are based on monthly rounded data. Labor force data were also rebenchmark in March 1999.

² Change is expressed in percentage points rather than actual percent change of the rates shown.

³ Ending June 30 of indicated year.

⁴ If tax period ends on a weekend or holiday some of the collections may be shifted to the next period.


NA Not available.

Note: Most data are preliminary and subject to revision.

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