



Houston Business

A Perspective on the Houston Economy

Houston and the Global Market for Engineering and Construction

The design, engineering and construction of large projects is a major industry in Houston. Engineering and construction companies provide and supervise staff on a contract basis to design and build projects all over the world. These projects range from factories, office and other buildings, power plants, and water or sewer systems to roads, airports, hazardous waste facilities and petrochemical plants.

The most important market for Houston engineering companies is one of the world's largest—building and upgrading chemical and fertilizer plants, oil refineries and other continuous-process industrial facilities. Table 1 lists 10 large engineering and construction companies that operate in Houston. The roster is not comprehensive, but it includes most of the large companies with a major presence in Houston and a significant international presence as well. Only two of the companies—Brown & Root and M. W. Kellogg—are headquartered here. The others are mostly headquartered in California or the northeastern United States.

The first column of Table 1 shows the number of licensed engineers each company employed in Houston in 1996, and the second shows the companies' total local employment. (A Houston-based construction unit, in addition to its engineering and design operations, swells Brown & Root's total.) The table also shows the percentage of each company's revenue earned outside the United States; in 1996 the average was 50 percent. The petrochemical market accounted for 67 percent of the revenues these companies earned. The percentage of each company's engineers who are based in Houston indicates that on average about 22 percent of the companies' work flows through

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Table 1
Ten Large Engineering and Construction Companies Operating in Houston

	Licensed engineers	Houston employment	Revenue (in millions)	International revenue (percent)	Petrochemical revenue (percent)	Houston share of engineers (percent)
Brown & Root	423	11,395	3,552	58	76	54
Fluor Daniel	500	3,200	9,009	54	68	28
M. W. Kellogg	525	2,850	1,865	62	98	100
Bechtel	414	1,917	7,498	54	48	13
Stone & Webster	222	1,400	812	48	60	na
Jacobs	274	1,350	3,923	23	69	33
Raytheon	214	1,427	2,651	29	72	3
ABB Lummus	200	1,010	1,666	90	97	34
Parsons	200	800	1,107	49	42	na
Kvaerner John Brown	81	750	1,004	33	76	29
Combined	3,053	26,099	33,087	50*	67*	22*

* Average percent of all 10 companies.

SOURCES: *Engineering News Record* and *Houston Business Journal*. Data are for 1996, except Houston share of engineers, which is for 1993.

Houston. The share varies widely, however, from 3 percent for Raytheon to 100 percent for M. W. Kellogg.

Engineering News Record (ENR) tracks the market for international contractors. Since 1994 the key measure for ranking companies and assessing the global market has been international revenues, whereas before *ENR* tracked the value of new international contracts. Because of this switch, the role of petrochemical contractors and markets looks somewhat smaller than it did, since initial petrochemical contracts are often bigger than other projects and their revenues spread over a longer period. The 1996 data, reported by *ENR* in mid-1997, remain the latest figures available.

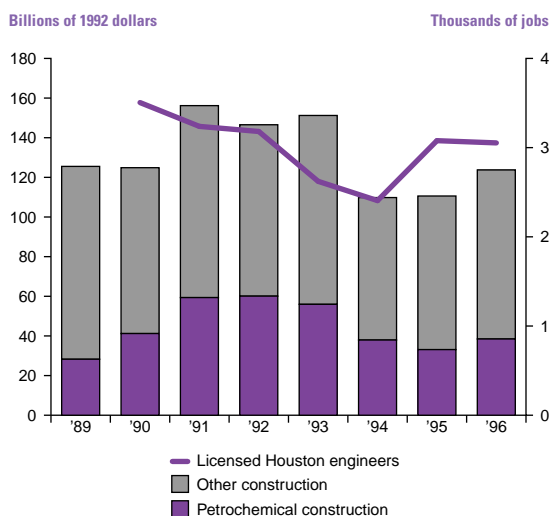
ENR regularly reports on the transactions of more than 200 firms operating in international markets, but contracts and revenues are highly concentrated in the hands of a few. In 1996, for example, the world's top 10 companies took 33 percent of global revenues, and the top 50 took 77 percent. The 10 companies in Table 1 are among the world's largest, and since the early 1980s they have regularly accounted for 20 percent to 40 percent of international contracts or revenues. Not surprisingly, their share of the global market has typically risen and fallen with the petrochemical market.

Figure 1 tracks the global market for international business from 1989 to 1996 (dollar values are adjusted for inflation). Following a deep trough in 1987, when global contracts totaled \$89 billion, the petrochemical market led an overall resurgence in the 1990s, with the market peaking at an average \$151 billion from 1991 to 1993. Both the overall market and

petrochemicals have since cooled, and office and other buildings have replaced petrochemicals as the largest of the global construction markets.

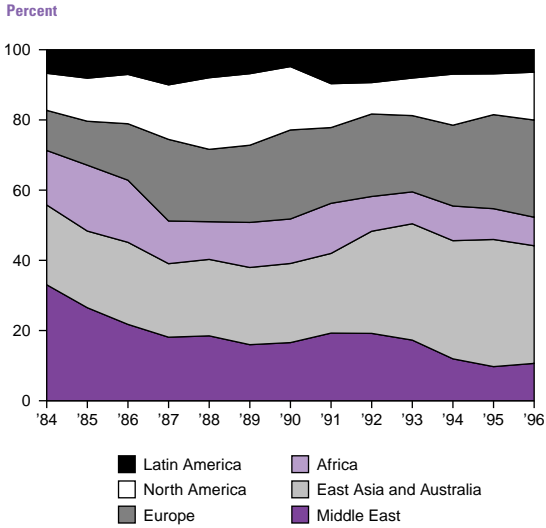
Figure 1 shows a 21 percent decline in international construction and a 36 percent drop in the petrochemical market for 1991–96. However, the 10 companies in Table 1 cut the number of licensed engineers in Houston by only 13 percent over the same period. Our estimate of the petrochemical segment of international construction in 1996 is based on its share of revenues and—as mentioned before—may overstate the decline. It is safe to conclude, however, that Houston engineers were cut back less than the drop in either the overall

Figure 1
Houston Engineering Jobs and New Contracts for International Construction



SOURCES: *Engineering News Record* and *Houston Business Journal*.

Figure 2
Distribution of the Global Construction Market by Area



SOURCE: *Engineering News Record*.

international market or the petrochemical piece of it. If domestic contracts are included, this picture does not change. The shift of work to Houston in a declining market would partly reflect a lower cost of doing business. Compared with its chief competitors in this field—Boston, Philadelphia, Los Angeles and San Francisco—Houston offers much cheaper labor and rents.

Although low cost helps Houston compete, the glue that binds these companies to the area is much like the glue that creates any other cluster of industrial activity in the United States. First, Houston is the focal point for new technologies and other developments in the design and construction of petrochemical facilities. Design and engineering companies need to be in Houston to ensure they are plugged into this important knowledge loop. Second, many of the industry's best customers—major chemical companies and integrated oil companies—are located in Houston. Third, the area's large number of engineers provides a pool of thousands of potential applicants for skilled-job openings.

Figure 2 shows the distribution of work won by international contractors by geographic market, based on the share of new contracts through 1993 and the share of revenues thereafter. Several trends are apparent. One is the long-standing decline of work in the Middle East, a stronghold for the petrochemi-

cal market and an area where American companies have long been the dominant builders.

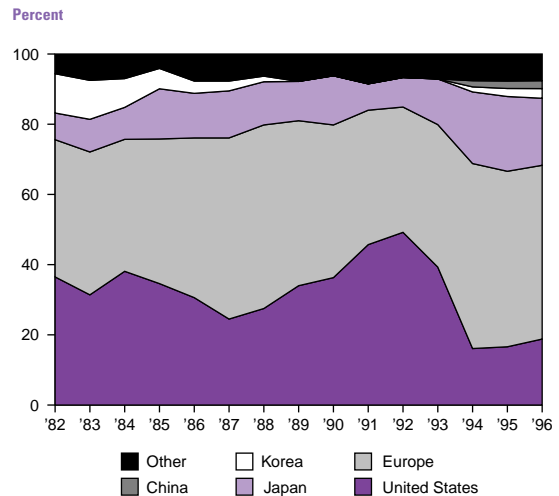
The other significant trend has been the rise of the Asian construction market. Fueled by annual real GDP growth rates in these countries of 8 percent to 10 percent since 1990, Asia has been the world's largest and fastest growing market in the '90s. These numbers, however, don't reflect the effects of last year's Asian financial crisis.

Figure 3 shows the distribution of winning contractors by exporting region, with the shares of each based on its annual share of new contracts or revenue. The relative decline of U.S. contractors may partly reflect the switch in measures after 1993, but it also reflects a significant drop in the number of petrochemical projects and the rise of tough new competitors in Asia. The figure clearly shows that Japanese, Chinese and Korean companies are winning a growing share of the overall market. The Europeans have always been formidable competitors, and companies in France, Germany, the United Kingdom and Italy regularly win significant shares of the global market.

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NOTE: Kathryn Day was a senior in the School of Business at the University of Houston—Clear Lake while doing research for this article.

Figure 3
Distribution of International Contract Revenues Earned, by Exporting Region



SOURCE: *Engineering News Record*.

The Houston economy is showing only scattered signs of a slowdown in response to lower oil prices, and most sectors remain on the strong growth path enjoyed last year. Auto sales, home sales and retailing were very brisk, while oil services, chemicals, machinery and other manufacturing experienced more moderate growth. The Houston Purchasing Managers Index fell to 56 in March and 54 in April, which indicates expansion continues but at the slowest pace since June 1996.

RETAILING AND AUTO SALES

Retailers reported a good spring, with overall strength in the Houston market. The only negative note was an Easter weekend that was not as strong as expected, though not so weak as to leave inventory problems in its wake. Auto sales in Harris County continued to set records through the first quarter, the result of low interest rates, factory incentives and healthy local job growth.

ENERGY PRICES

Crude oil remained the focus of attention in recent weeks, as prices rebounded from \$13 per barrel in mid-March on news that OPEC and non-OPEC producers would join in production cuts. After briefly moving above \$17 a barrel, prices fell back to near \$15 as market skepticism grew about the likelihood and size of the cuts.

Natural gas prices remained relatively steady, in contrast. Respondents pointed to a diminished linkage between oil and gas markets due to environmental limitations on burning oil in industrial and utility boilers. Strong demand, flat production levels and the possibility of a hot summer were also cited as factors in keeping gas prices near \$2.50 per thousand cubic feet.

OIL SERVICES AND MACHINERY

The rig count has fallen by 100 rigs, or about 10 percent, in recent weeks, as drilling has shifted away from oil and toward natural gas. The Rocky Mountains, Texas Panhandle and West Texas have seen reduced drilling

activity and South Texas has weakened, while the Gulf Coast and the Gulf offshore remain strong. Oil services and machinery report only a moderate reduction in demand, plus good pricing and a continued backlog. The oil service market is less frantic with the decline in oil prices; shortages are fewer and lead times are shrinking.

CHEMICALS

Shrinking demand and low prices in Asia continue to take a toll on plastic resins such as polyvinyl chloride, vinyl chloride monomer and acrylonitrile. Domestic demand remains good but is not strong enough to prevent price deterioration in a wide range of petrochemical products. Margins have been helped by the fall in oil prices, but natural gas is a more important feedstock on the Gulf Coast, and its price has remained relatively high.

REFINING

This winter and spring were difficult for refiners, with warm weather pulling down the price of heating oil faster than the price of crude. The result was a squeeze on profit margins, which ran 20 percent to 30 percent below those earned a year earlier. Inventories of heating oil are being brought into line, and refinery production has shifted to gasoline. The prospect of a strong driving season this summer has already stabilized and improved gasoline prices and refiners' margins.

HOUSING MARKETS

Both new and existing home sales continued at the best rates of the past decade. New home construction was slow to pick up in late 1996 and has been further slowed by wet weather and shortages of both lots and labor. Construction will remain strong through the rest of this year, as builders deliver existing backlogs and rebuild inventory. Apartment construction in 1998 will triple the pace of recent years but probably can be justified on the basis of job growth that has already occurred.

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