

THE MINERAL INDUSTRY OF

TAIWAN

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The Asian financial crisis had a major impact on Taiwan's economic growth in 1998, with the growth rate only reaching 4.8%; however, the island still achieved the second highest economic growth behind China among Asian countries. The consumer price index increased at a moderate rate and unemployment increased slightly to 2.7%, owing to sluggish exports and decline in the real estate and stock markets (Council for Economic Planning and Development, 1999a).

For the first time since 1983, exports suffered a negative growth and imports recorded a serious drop for the first time since 1985. In 1998, the island's total trade was \$215.4 billion, a decline of 8.9% from that of 1997. Exports for the year accounted for \$110.6 billion, of which minerals were valued \$49.0 million. Imports declined to \$104.8 billion and the share of minerals was \$6.4 billion (Council for Economic Planning and Development, 1999b). Leading imported mineral commodities were crude oil, coal, iron ore, natural gas, limestone, marble, scrap metals, and kaolin in order of rank, accounting for about 90% of total mineral imports.

Because Taiwan was poor in mineral resources, the value of domestic mining sector output accounted for less than 1% of the island's gross national products. In 1998, the value of mineral output was \$1.42 billion. Coal, oil, and natural gas were the country's most valuable mineral products. Dolomite, limestone, and marble were the most important commodities in the nonfuel mining sector. In the metals sector, the country produced iron and steel and processes aluminum, copper, lead, nickel, tin, and zinc from imported raw materials.

The downturn of Taiwan's construction sector and Southeast Asia's financial crisis hit Taiwan's aluminum producers hard. Taiwan's aluminum companies relied on imports of aluminum ingots and aluminum scrap and then processed them into semimanufactured aluminum alloy products. In 1998, the island produced 388,261 metric tons (t) of aluminum and aluminum alloy ingots from remelted imported aluminum ingots and scrap, compared with 449,536 t in 1997 (Department of Statistics, 1999, table C-2). There were more than 20 aluminum companies with a total output capacity of 500,000 metric tons per year (t/yr). Major aluminum alloy ingot producers were China Steel Aluminium Co. Ltd. and Feng An Metal Industrial Co. Ltd. Taiwan consumed about 720,000 t/yr of aluminum. The gap between supply and demand was filled with imports. Imports of unwrought aluminum and aluminum alloy were mainly from the United States, followed by Japan and western European countries.

In 1998, there were 13 cement producers operating 16 plants—9 in the west coast and 7 in the east coast—with a total output capacity of 23 million metric tons per year (Mt/yr) from

24 kilns. Upon the expiration of the limestone mining rights on the island's west coast in the next 2 years, cement producers will relocate their plants to the east coast, and the Hualien and Suao areas will become the cement producing centers in Taiwan. Owing to the slowdown in the construction sector, the demand of cement continued to decline in 1998. Because of the decline of cement prices in the Asian markets, cement imports increased by more than 40% in 1998, compared with that of 1997.

The construction of Taiwan Cement Corp.'s (TCC) \$2.93 billion cement plant in the Hoping Cement Industrial Park, north of Hualien County, began in 1998. The first kiln was scheduled to be completed in the second quarter of 2000, and the second kiln was expected to be put into operation at yearend 2000. Each kiln would have an output capacity of 2.7 Mt/yr of cement. The TCC plan also included the construction of a \$1.39 billion powerplant in the zone. The powerplant, which was scheduled to be completed in 2001, would have an installed capacity of 1.32 million megawatts. In addition, TCC would invest \$510 million to build a new port at the production zone. The facility would handle 19 Mt/yr of cement through nine docks and was scheduled to be completed in 2001. Some local cement producers, however, expressed their doubts about TCC's plan because of intense competition from imported cement, which could lead to a low rate of return on such a massive investment project (Ministry of Economic Affairs, 1999).

Without any copper resources, Taiwan was required to import about 700,000 t/yr of refined copper and copper products for domestic demand. The island, however, reprocessed imported raw materials into semimanufactured products and exported 40% of these products. Chile, Japan, and the United States were major suppliers for refined copper, and the United States was the principal source of scrap for Taiwan.

S & T Copper Industries Co. Ltd. invested \$162.2 million to build a copper processing plant in Yangmei, Taoyuan County. The plant was designed to have an output capacity of 120,000 t/yr of various type of copper products including brass, phosphor bronze, ferrous copper, and copper plates for integrated circuits. Construction began in May 1998 and was scheduled to begin trial runs in the third quarter of 1999. S & T produced 33,000 t/yr of copper plates and sheets from imported raw materials (Ministry of Economic Affairs, 1998).

In 1998, Taiwan ranked 13th in the world in crude steel production and was one of few steel-producing countries in the Asia and Pacific region to register an increase in crude steel production (Metal Bulletin, 1999b). Domestic crude steel

output provided about 70% of its demand. Taiwan consumed more than 27 million metric tons (Mt) of steel products in 1998, a decrease of 4% from that of 1997. The supply and demand gap was met by imports (Steel Statistics Monthly, 1999). For 1998, iron ore imports in Taiwan grew to 14.17 Mt, a 0.9% increase more than that of 1997. Australia was the largest source, accounting for 59.1%, followed by Brazil, 29.1%; India, 8.2%; and others, 3.6%.

China Steel Corp. (CSC) is the only integrated steel producer in the island. Taiwan had steel output capacity of 17.49 Mt/yr—8.05 Mt/yr from CSC's 6 converters and 944 Mt/yr from 33 electric arc furnaces. Taiwan's steel sector has the potential for further growth, however, with limited industrial land spaces, tough environmental regulations, and high labor costs, steel producers were considering relocating their production facilities to cheaper locations.

CSC intended to purchase shares of Megasteel in Malaysia from Lion Group of Malaysia. Megasteel, which is 50.1% owned by Lion Group had, was scheduled to be commissioned in December 1998. Amsteel, an affiliate of Lion Group, owned the remaining share. The plant was designed to produce 2.5 Mt/yr of flat products. With only limited expansion available on the Kaohsiung site, CSC intended to turn to Southeast Asia as its second production site, and the discussion of merging with other local mills was underway (Metal Bulletin, 1998c). CSC also was interested in obtaining shares of Indonesia's Krakatau Steel (Metal Bulletin, 1998a). The Yieh Loong Group also searched for sites in Australia and Malaysia on which to build an upstream plant, while the plan to build a 7.5 Mt/yr steel plant at Chiku, near Tainan, continued to be opposed by local community.

The Ministry of Economic Affairs (MOEA) intended to privatize the island's oldest stainless steel producer, Tang Eng Iron Work, in 1999. The Ministry planned to retain 49% of the company's equity after 1999. CSC held 8.5% share in the company. The company planned to reduce the workforce in order to become more efficient (Metal Bulletin, 1998f).

Owing to financial problems, An Feng Steel Co. Ltd. of Taiwan decided to pull out of the An Feng Kingstream's project to build a 2.6-Mt/yr slab plant in Western Australia. The project was to revert to Australian ownership following the proposed restructuring of An Feng Kingstream Steel in August 1998. In November 1998, An Feng reached an agreement with Trans-World, a trading company, on tolling arrangement on slab from Australia, Brazil, China, and Russia for An Feng's hot strip mill in Kaohsiung. Trans-World assisted in the sale of An Feng's newly affiliated Jenn An Steel, a cold-rolled coil and galvanizing plant, products (Metal Bulletin, 1999a).

In August 1998, Sheng Yu Steel commissioned its 80,000-t/yr painting line and decided to add the second line at Kaohsiung that would increase the company's painted sheet capacity to 180,000 t/yr by the end of 1999. Sheng Yu also added a 250,000-t/yr hot dipped galvanizing line to its existing Kaohsiung site. The galvanizing facility was supplied by Nippon Steel Corp. and was scheduled to be commissioned by the fourth quarter of 1999. The cost of both lines was estimated at \$950 million (Metal Bulletin, 1998d).

Feng Hsin Iron and Steel Co. Ltd. was building a new

reheating furnace at its Taichung site. The furnace would be completed in June 1999, and would allow the company to increase billet sizes from 130 millimeters (mm) to 160 mm. The company had a crude steel output capacity of 1 Mt/yr and a rolling capacity of 550,000 t/yr of sections, 250,000 t/yr of angles, and 360,000 t/yr of bar and rod. The company relied on imported billet to produce better quality steels. With the new furnace installed, the company will reduce its free-cutting billets that imports (Metal Bulletin, 1998b).

In 1998, Taiwan was one of six countries under the U.S. International Trade Commission (ITC) dumping investigation on stainless steel wire rod that was purchased by U.S. producers—Al Tech Speciality Steel Corp., Carpenter Technology, Republic Engineered Steels Inc., and Talley Metals Technology Inc. (Steel Times International, 1998). In early 1999, the ITC ruled that U.S. steel producers were not materially injured or threatened by imports of stainless steel from Taiwan and other countries (U.S. International Trade Commission, 1999). Taiwan's CSC and Yieh Loong were gathering data on hot coil imports from Brazil and Russia and planned to file a dumping case against them with the Ministry of Finance in 1999 (Metal Bulletin, 1998e).

Taiwan has limited energy resources and is becoming more reliant on imported energy to meet its domestic demand. In the past several years, coal production dropped sharply. In 1998, Taiwan produced less than 80,000 t of coal from three active coal mines and imported more than 36 Mt of different kinds of coal from Australia, Indonesia, China, South Africa, and the United States. Imports from Indonesia and China increased in 1998 from those of 1997, but imports from Australia, South Africa, and the United States declined. Taiwan Power Co. was the island's major coal consumer and imported more than 20 Mt, while CSC was the second largest coal consumer, importing more than 7 Mt of coal. Owing to the high costs of production and an increase in difficult mining conditions, all coal mines will cease operation in 2000.

Taiwan's oil exploration and refining was mainly dependant on the state-owned Chinese Petroleum Corp. With limited oil resources, Taiwan relied heavily on imports of crude oil from 10 countries in the Middle East and Africa. MOEA planned to liberalize the domestic petroleum market in January 1999, allowing private imports of industrial fuel oil, aviation fuel, and liquefied petroleum gas. Importers must submit reports to the Energy Commission under MOEA, detailing plans for storing and marketing of imported products (Free China Journal, 1999).

Formosa Plastics Group (FPG) planned to expand its petrochemical complex at the Yunlin Sandbank Industrial Park in Yunlin County. FPG applied to the Industrial Development Bureau for permission to invest an additional \$1.16 billion in the complex. FPG and the Chang Chun Petrochemical Co. Ltd. would set up 11 plants to produce petrochemical products for the electronic sector. FPG's naphtha cracker plant began commercial production in 1998, with output capacity of 450,000 t/yr of ethylene. Taiwan's total ethylene increased to 1.46 Mt/yr. Even with an additional of FPG's cracker plant, local ethylene production remained unable to meet domestic demand (Free China Journal, 1998).

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TABLE 1
TAIWAN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998
METALS					
Gold, primary kilograms	5	11	11	9	9
Iron and steel, metal:					
Pig iron thousand tons	5,941	6,056	6,050	8,870	8,800 e/
Ferroalloys:					
Ferromanganese	11,179 r/	13,136 r/	14,059 r/	12,130 r/	12,532
Ferrosilicon	646 r/	288 r/	2,481 r/	3,391 r/	3,775
Steel, crude thousand tons	11,590	11,605	12,655	15,478	17,192
Nickel, refined e/	10,000	10,000	10,000	10,500	9,700
INDUSTRIAL MINERALS					
Cement, hydraulic thousand tons	23,722	22,478	21,537	21,522	19,538
Clays:					
Fire clay	24,354	10,194	9,230	5,045	2,967
Kaolin e/	100,000	100,000	95,000	80,000	79,000
Feldspar	854	--	20	--	--
Gypsum, precipitated	2,876	3,136	2,603	2,317	2,221
Lime e/	650,000	650,000	650,000	650,000	800,000
Mica	5,220	9,792	8,510	7,806	7,750
Nitrogen, N content of ammonia	215,377	225,750	251,850	249,715	231,419
Salt, marine	185,987	220,531	233,321	62,484	7,425
Sodium compounds, n.e.s.:					
Caustic soda	171,840	183,330	196,980	204,470	230,620
Soda ash e/	128,327 2/	128,090 2/	128,000	127,000	126,500
Stone:					
Dolomite thousand tons	264	196	116	198	181
Limestone do.	13,297	13,270	11,332	15,447	2,927
Marble do.	17,740	16,975	17,528	18,071	17,519
Serpentine do.	475	447	526	436	421
Sulfur	154,778	167,468	181,600	163,964	184,324
Talc	4,290	3,500	1,500	1,331	73
MINERAL FUELS AND RELATED MATERIALS					
Carbon black	80,691	90,384	100,234	103,450	100,000 e/
Coal, bituminous	285,099	234,965	147,497	98,203	79,310
Gas, natural:					
Gross million cubic meters	867	889	874	849	870
Marketed e/ do.	820	820	810	780	790
Petroleum:					
Crude thousand 42-gallon barrels	431	369	358	319	340
Refinery products:					
Gasoline do.	47,320	50,150	52,780	51,520	50,000 e/
Kerosene e/ do.	2,000	2,000	2,000	3,500	3,000
Diesel oil do.	36,540	37,150	36,140	43,010	40,000 e/
Fuel oil do.	88,580	99,630	95,900	92,950	92,000 e/
Lubricants fuel oil e/ do.	1,000	1,000	1,000	1,000	1,000
Asphalt e/ do.	2,500	2,500	2,500	4,550	4,000
Liquefied petroleum gas do.	15,380	15,490	15,520	16,380	16,500 e/
Other 3/ do.	17,300	19,240	20,810	20,000	20,000 e/
Total e/ do.	210,620	227,160	226,650	232,910	226,500

e/ Estimated. r/ Revised.

1/ Includes data available through August 30, 1999.

2/ Reported figure.

3/ Includes naphtha, solvent oil, and base oil.

TABLE 2
TAIWAN: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity e/
Cement		Asia Cement Corp.	Hsinchu	1,800
Do.		do.	Hualien	4,020
Do.		Chia Hsin Cement Corp.	Kaohsiung	1,860
Do.		Lucky Cement Corp.	Tungao	2,000
Do.		Chien Tai Cement Co. Ltd.	Kaohsiung	1,758
Do.		Hsing Tai Cement Co. Ltd.	Taipei	1,300
Do.		Taiwan Cement Corp.	Chutung	1,400
Do.		do.	Hualien	280
Do.		do.	Kaohsiung	1,900
Do.		do.	Suao	3,400
Do.		Universal Cement Corp.	Kaohsiung	1,550
Coal, bituminous		Numerous independent operators	Taipei Prefecture (12 pits)	200
Marble		Taiwan Marble Co., Ltd.	Panchiao	10
Nickel		Taiwan Nickel Refinery	Kaohsiung	12
Petroleum:				
Crude	thousand barrels per year	Chinese Petroleum Corp.	Chuhuangkeng and Tungtzuchiao	850
Refinery products	thousand barrels per day	do.	Kaohsiung	570
Do.	do.	do.	Taoyuan	200
Do.	do.	Formosa Plastics Group	Yunlin	450
Steel		China Steel Corp.	Kaohsiung	10,000
Do.		Feng Hsin Iron and Steel Co. Ltd.	Taichung Hsien	1,000
Do.		Tang Eng Iron Work Co. Ltd.	Kaohsiung	288
Do.		Yieh United Steel Corp.	do.	1,000
Sulfur		China Petrochemical Development Corp.	Taipei	50

e/ Estimated.