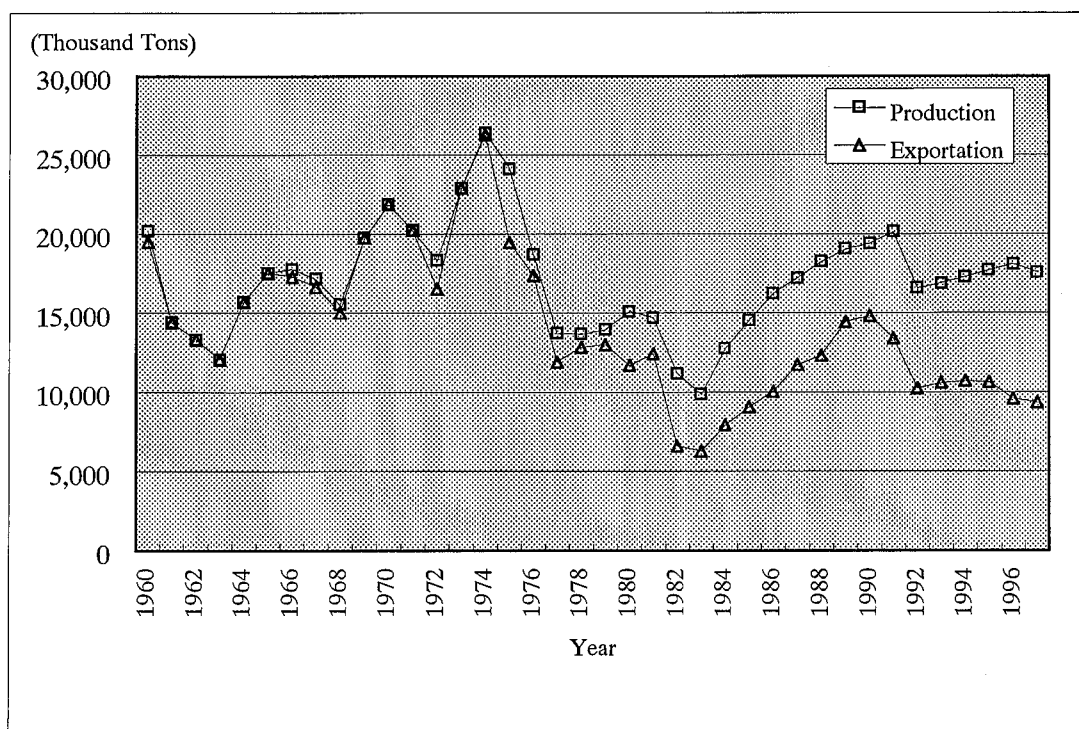


4.5 Production and Transportation Situation of Main Enterprises

Corporation Venezuela of Guayana (CVG) was established in 1960 to promote the economy of Orinoco basin region. CVG manages iron, steel, bauxite, aluminum, electricity supply industries. Main enterprises related to waterway transportation in Puerto Ordaz are Ferrominera under the umbrella of CVG, Group of Aluminum Industry which is composed of ALCASA, CARBONORCA, BAUXILUM and VENALUM, Corpoven under jurisdiction of PDVSA, SIDOR privatized in 1997, FIOR, VENPRECAR, OPCO, which is concerned with direct reduced iron production and exportation. In 1997 cargo throughput of above mentioned enterprises accounted for more than 95% of the total volume in Puerto Ordaz.

4.5.1 Iron ore

Ferrominera explores and produces iron ore (fine/lump) which is transported by private railway from four iron mines, namely, San Isidro, Las Pailas, Los Barrancos and Cerro Bolivar at present. Total length of rail way connecting four iron mines with iron ore loading port, Ferrominera (Palua) Port, Ferrominera (Puerto Ordaz) Port, is 286 km. Production/Exportation volume of iron ore (inclusive of pellet made from fine) from 1960 to 1997 is given in Fig. 4-5-1.



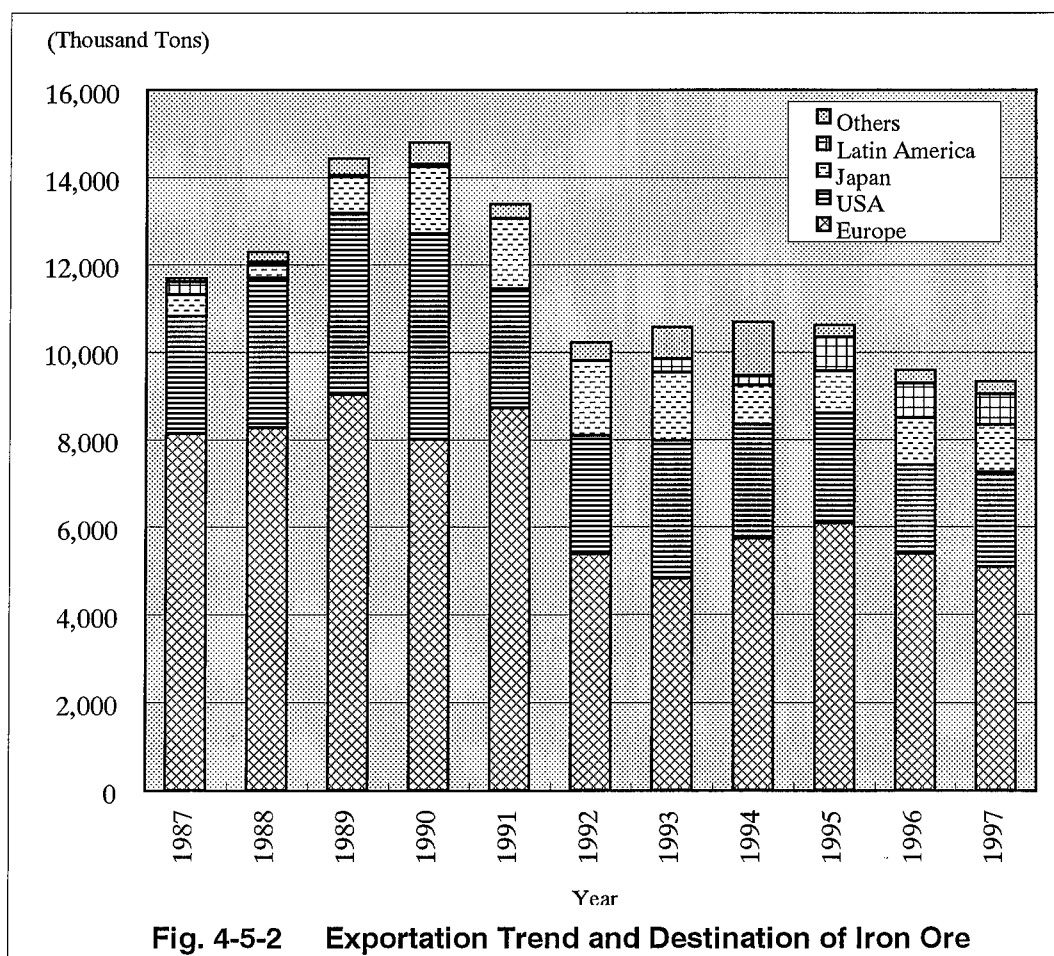
Note ; Including Pellet

Source; Ferrominera Production Record

Fig. 4-5-1 Iron Ore Production/Exportation Volume

In 1997 Ferrominera produced 17,558 thousand tons, of which 9,320 thousand tons was transported by waterway of the Orinoco River for the foreign market. The maximum production recorded is 26,408 thousand tons in 1974, of which 26,277 thousand tons was exported. Almost all iron ore was exported before the direct reduced iron plant began operations. Direct reduced iron plant, SIDOR and FIOR started to operate in 1976, VENPRECAR and OPCO started to operate in 1990. The share of exportation has increased gradually with the operation of these plants.

Region-wise Exportation trend of iron ore in recent eleven years is given in Fig. 4-5-2. In 1997 Europe accounts for 54.5% of the total exportation volume, followed by USA (23.2%), Japan (11.7%) and Latin America (7.5%). There has been no remarkable change in regional shares recently. Furthermore, country-wise exportation of iron ore in recent four years is given in Table 4.5.1.



Note ; Including Pellet

Source; Ferrominera Production Record

Table 4.5.1 Iron Ore Transport Destination

(Unit: Thousand Tons)

	1994			1995			1996			1997		
	Fine	Lump	(Total)	Fine	Lump	(Total)	Fine	Lump	(Total)	Fine	Lump	(Total)
<i>USA</i>	475	2,124	2,599		2,504	2,504		2,033	2,033		2,162	2,162
Mexico			0		271	271	18	87	105			0
Colombia	31		31	27		27	67		67	32		32
Argentina			0			0			0		70	70
Trinidad		201	201		467	467		618	618		601	601
<i>Latin America</i>	31	201	232	27	738	765	85	705	790	32	671	703
Romania	630		630	449		449	117	107	224	267	450	717
Belgium	482		482	489		489	498		498	482	117	599
Bulgaria	319		319	516		516	525		525	544		544
Italy	633	375	1,008	675	333	1,008	516	151	667	546	125	671
Spain	789		789	677		677	449		449	283	20	303
UK	1,292		1,292	1,559		1,559	1,629		1,629	1,432		1,432
France	166		166	211		211	342		342	212		212
Portugal	254		254	128		128	52		52			0
Serbia			0			0	132		132			0
Holland	740		740	995		995	852		852	604		604
Turkey	53		53		52	52			0			0
<i>Europe</i>	5,358	375	5,733	5,699	385	6,084	5,112	258	5,370	4,370	712	5,082
Japan	797	100	897	844	129	973	1,019	73	1,092	948	138	1,086
China	1,226		1,226	280		280	295		295	287		287
<i>Far East</i>	2,023	100	2,123	1,124	129	1,253	1,314	73	1,387	1,235	138	1,373
(Foreign Total)	7,887	2,800	10,687	6,850	3,756	10,606	6,511	3,069	9,580	5,637	3,683	9,320
Domestic	4,014	2,569	6,583	4,632	2,454	7,086	5,858	2,632	8,490	5,395	2,843	8,238
(Grand Total)	11,901	5,369	17,270	11,482	6,210	17,692	12,369	5,701	18,070	11,032	6,526	17,558

Note; "Lump" includes "Pellet" in Mexico and Trinidad

Source; Iron Ore Import Yearbook 1998

4.5.2 Direct Reduced Iron

In Puerto Ordaz five enterprises/twelve plants produce direct reduced iron (see Table 4.5.2). In 1997 production volume was estimated to be 5,490 thousand tons, of which 1,810 thousand tons were exported mainly to USA.

Table 4.5.2 Outline of Direct Reduced Iron Plants

Enterprise	Production Method (Number of Plant)	Operation Beginning year	Estimated Production Volume in 1997 (Thousand Tons)
SIDOR	HYL(4) MIDREX(4)	1976	3,290
FIOR	FIOR(1)	1976	400
VENPRECAR	MIDREX(1)	1990	700
OPCO	MIDREX(1)	1990	1,100
COMSIGUA	MIDREX(1)	1998	-

Source; CVG-Iron Ore Production Statistics, SIDOR Port Statistics, Iron Product Flow

Production flow of iron ore, direct reduced iron and steel products in 1997 is shown in Fig. 4-5-3. Total production volume of iron ore, direct reduced iron and steel products was 17,558 thousand tons, 5,490 thousand tons and 3,738 thousand tons respectively. Here, production volume of direct reduced iron by SIDOR was 3,290 thousand tons, almost all of which was processed to steel products and a part of that was exported without processing.

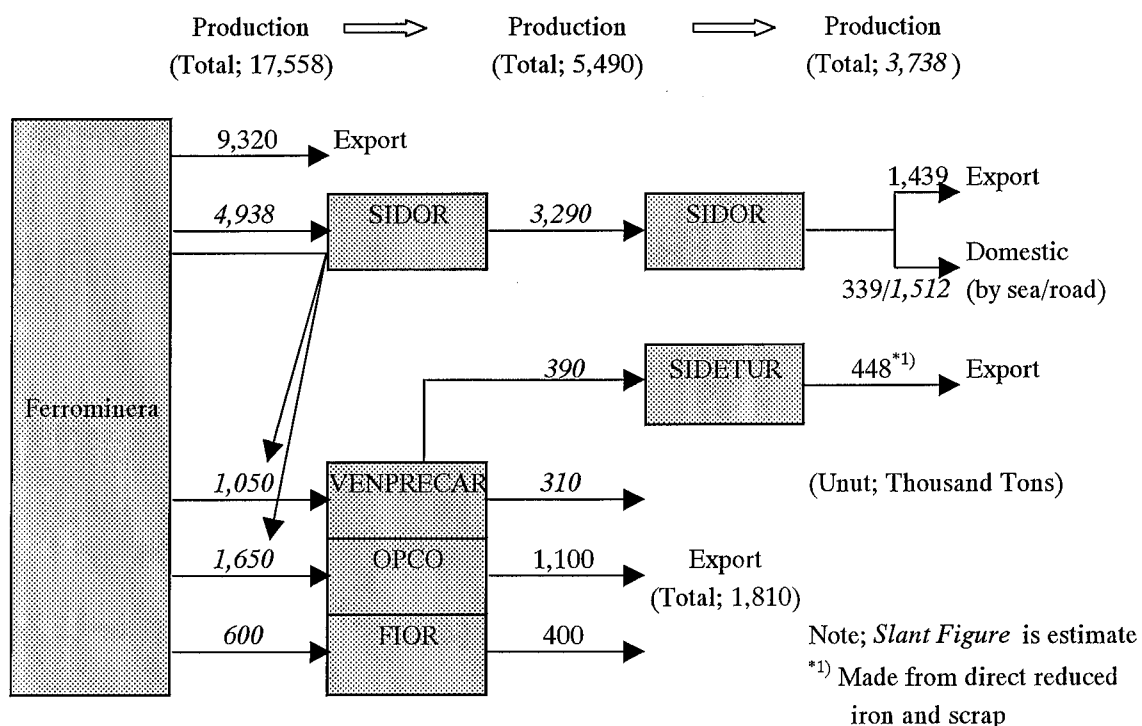


Fig. 4-5-3 Product Flow of Steel Related Industries in 1997

4.5.3 Aluminum Related Products

Aluminum related industries are prosperous in Puerto Ordaz using the bauxite exploited at the upper reaches of the Orinoco River and the cheap electricity which is provided from Guri dam (electric generation capacity is about 10,000 mega-watts and the second largest hydroelectric power station next to Itaipu in Brazil in the world).

Production/forwarding volume from 1994 to 1997 of Group of Aluminum Industry which is comprised of ALCASA, CARBONORCA, BAUXILUM and VENALUM is given in Table 4.5.3. In 1997 total bauxite transportation volume from El Jobal Port to BAUXILUM Port by barge was 4,907 thousand tons, of which 4,690 thousand tons was spent for material of alumina, while 217 thousand tons was exported. BAUXILUM produced 1,773 thousand tons of alumina, of which 480 thousand tons was exported and 1,293 thousand tons was provided for VENALUM and ALCASA by belt conveyer.

Furthermore, using alumina as materials, VENALUM produced 402 thousand tons of aluminum ingot, of which 282 thousand tons was exported and 120 thousand tons was transported for domestic consumption. On the other hand, ALCASA produced 202 thousand ton of aluminum ingot, of which 129 thousand tons was exported and 73 thousand tons was transported for domestic consumption. Destination share of aluminum related industry products is shown in Table 4.5.4 and production flow of that is shown in Fig. 4-5-4.

Table 4.5.3 Forwarding Volume of Group of Aluminum Industry

(Unit: Thousand Ton)

Enterprise	Product	Classification of Dispatch	Transport Mode	Forwarding Volume			
				1994	1995	1996	1997
BAUXILUM	Bauxite	Foreign	Ship		38	349	217
		Domestic	Barge	5,065	4,935	4,715	4,690
	Alumina	Foreign	Ship	253	469	304	480
		Domestic	Belt Conveyer	1,252	1,232	1,332	1,293
VENALUM	Aluminum	Foreign	Ship	320	312	304	282
	Ingot	Domestic	Truck	87	102	136	120
ALCASA	Aluminum	Foreign	Ship	118	119	132	129
	Ingot	Domestic	Truck	61	75	70	73
CARBO- NORCA	Anode	Foreign	Truck	17	25	34	18
		Domestic	Truck	143	114	105	110

Source: Group of Aluminum Industry

Table 4.5.4 Destination Share of Aluminum Related Industry Products

Enterprise	Product	Country	Share(%)
BAUXILUM	Bauxite	USA	100
	Alumina	Norway	100
VENALUM	Aluminum Ingot	Japan	46
		USA	38
		Mexico	11
		Europe	4
		Colombia	1
ALCASA	Aluminum Ingot	USA	43
		Colombia	28
		Central America	14
		Europe	7
		Others	8

Source; Group of Aluminum Industry

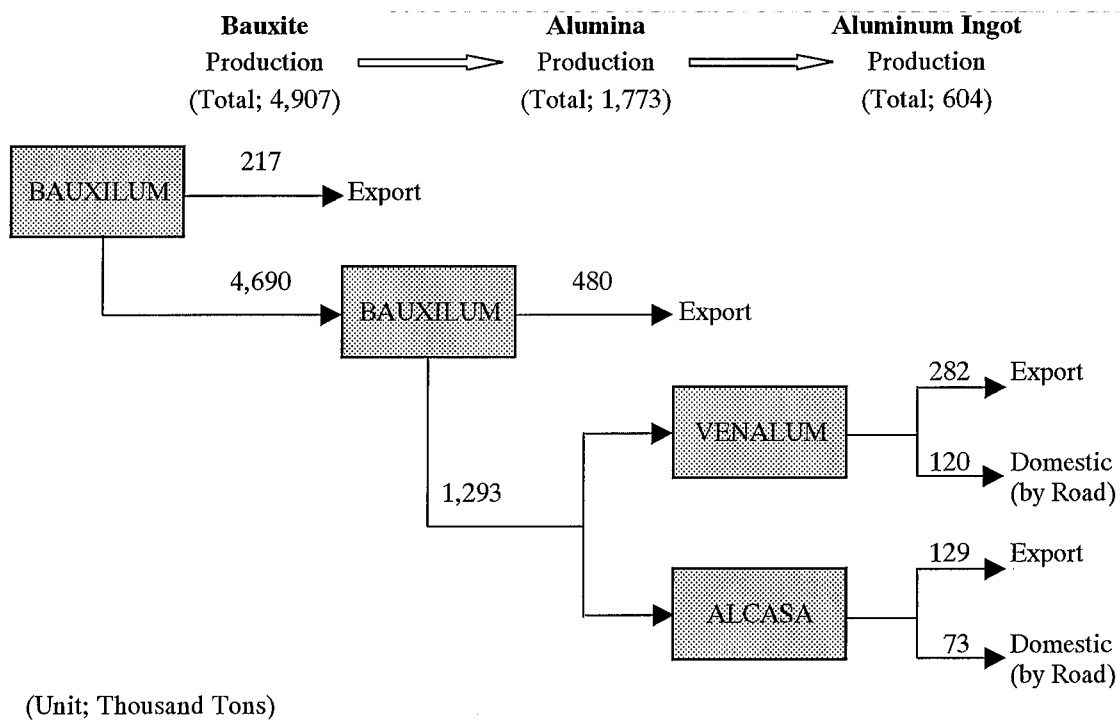


Fig. 4-5-4 Product Flow of Aluminum Related Industries in 1997