



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

TABLE OF CONTENTS

- 1.0 INTRODUCTION
- 2.0 APPROACH FOR ASSESSING MARKET POTENTIAL
 - 2.1 DEVELOP A "SALES PITCH" FOR CANAL
 - 2.2 IDENTIFY POTENTIAL TARGETS
 - 2.3 MEETINGS IN MALAYSIA
- 3.0 SUMMARY OF FINDINGS
- 4.0 CONCLUSIONS AND RECOMMENDATIONS

ATTACHMENTS

- 1. "SALES PITCH"
- 2. MSDS FOR CANAL
- 3. "SYNTHETIC SLAGS FOR STEEL MAKING" BY MICHAEL WILLIAMS
- 4. BACKGROUND INFORMATION ON MAJOR STEEL COMPANIES IN MALAYSIA
 - 4.1. PERWAJA STEEL SDN. BHD.
 - 4.2. MALAYAWATA STEEL BHD.
 - 4.3. SOUTHERN STEEL BHD.
 - 4.4. AMSTEEL MILLS SDN. BHD.
 - 4.5. MAGASTEEL SDN. BHD.



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

1.0 INTRODUCTION

PARS Environmental, Inc (PARS) was retained by Shieldalloy Metallurgical Corporation (SMC) to perform a preliminary assessment of the market potential of CANAL slag for steel companies in Malaysia.

SMC's Newfield facility currently holds U.S. Nuclear Regulatory Commission (USNRC) License No. SMB-743 which permits possession, use and storage of source material contained in raw materials for the production of ferrocolumbium, columbium-nickel alloys and by-products. Ferrocolumbium is produced by a modified electric arc and aluminothermic reduction of the pyrochlore ores. The byproduct slag contains calcium, aluminum, uranium, thorium and other trace constituents. The uranium and thorium, comprising approximately 0.5 percent by weight of both the feed material and the slag, are naturally occurring radioactive elements. Consequently a USNRC license pursuant to 10 CFR 40 is required. The average radionuclide concentrations in ferrocolumbium slag are approximately 380 pCi/g each of thorium and uranium.

CANAL is produced from ferrocolumbium slag which is a by-product of past manufacturing operations at SMC when the Newfield facility manufactured specialty steel and super alloy additives, primary aluminum master alloys, metal carbides, powdered metals and optical surfacing products. There is an estimated 50,000 tons of CANAL stockpiled at SMC in Newfield. CANAL contains low levels of uranium and thorium which require the purchaser or recipient in the United States to be licensed by the U. S. Nuclear Regulatory Commission. This requirement has resulted in the market for CANAL in the United States to be virtually non-existent. However, a number of foreign countries do not require specific licensing of these low levels of radioactive materials. Malaysia is deemed to be one of these countries.

Malaysia is a developing country with a population of about 24 million. The GDP per capita is about \$10,400 and the growth in 2005 was about 7 percent. There are seven major steel manufacturing plants and the combined domestic production capacity is about 60 percent of the steel used in 2005. There are two new steel manufacturing plants that are planned for 2006 and nation's master plan calls for Malaysia to be self sufficient in steel production by 2020.



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

2.0 APPROACH FOR ASSESSING MARKET POTENTIAL

The approach for assessing the market potential for CANAL in Malaysia was divided into three tasks as described below.

Task 1 Review “sales pitch” for CANAL

The purpose of this task was to develop a one page summary of CANAL accompanied with appropriate backup of detailed technical information to be used in presentations in Malaysia. The one page summary was concise and focused, and described the composition, use, advantages, etc. of CANAL. The one page summary was used as a door-opener for senior managers in Malaysia; this was accompanied with more information for technical presentations to plant personnel.

Task 2 Identify potential targets

The purpose of this task was to identify potential end use clients for CANAL in Malaysia. This task was done in conjunction with contacts and resources that PARS currently has in Malaysia. For each potential client, background information was obtained including plant size, location, annual production capacity, annual sales, products manufactured, etc. including the potential interest in CANAL. The information developed in TASK 1 was used in TASK 2 to identify potential end use clients for CANAL. The five largest steel companies in Malaysia were identified as potential clients to visit.

Task 3 Meetings in Malaysia

The purpose of this task was to meet with potential end use clients in Malaysia to present information on CANAL and to determine the interest in using CANAL in their manufacturing operations. It was anticipated that two to four meetings with clients would be arranged in a one week period (April 10 thru April 14). Because of the response to the initial contact, seven meetings were arranged in a four-day period; Tuesday April 10 was a national holiday (Prophet Mohammed’s birthday) and that day was used as a travel day from Kuala Lumpur to Penang.

2.1 DEVELOP A “SALES PITCH” FOR CANAL

The “sales pitch” was a one page summary of CANAL that described the composition, use and advantages of CANAL. A copy of the one page summary of CANAL is shown in Attachment 1 to this report. Also used in the sales pitch was the Material Safety Data Sheet (MSDS) for CANAL; this is shown in Attachment 2 .

The information for developing the one page summary was obtained from the following three documents provided to PARS by SMC:



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

“Radiological Impacts from the Use of CANAL Fluidizer in Steel Production”; a report prepared by Integrated Environmental Management, Inc.; dated October 1994; revised April 13, 1995.

“Work Plan for a Trial Slag Crushing Operation”; a report prepared by Integrated Environmental Management, Inc. dated January 6, 1995.

“Synthetic Slags for Steelmaking”; an undated report by Michael Williams, Shieldalloy Metallurgical Corporation.

A copy of the Williams report is included in Attachment 3 in this report.

2.2 IDENTIFY POTENTIAL TARGETS

The Malaysian Steel Industry directory was the primary source of information used to identify potential targets and to send introductory e-mails. Based on the initial research, introductory e-mails were sent to forty-one (41) large and medium-size steel manufacturing companies in Malaysia. This task was done in conjunction with contacts and resources that PARS currently has in Kuala Lumpur, Malaysia. After a review of available information, the target list was narrowed to the five largest steel companies in Malaysia. The five steel companies are listed below:

1. Perwaja Steel Sdn. Bhd.

Perwaja Steel has its corporate offices in Kuala Lumpur and has two steel plants, one in Bedong, Kedah (referred to as the Gurun Plant), about 250 miles north of Kuala Lumpur, and the other in Kemaman, Terengganu, about 200 miles north-east of Kuala Lumpur. Perwaja Steel is part of Maju Holdings, a huge conglomerate with diversified investments.

2. Malayawata Steel Bhd.

Malayawata Steel has its corporate offices in Petaling Jaya (a suburb of Kuala Lumpur) and its steel plant is in Penang, about 200 miles north of Kuala Lumpur..

3. Southern Steel Bhd.

Southern Steel has its corporate office and plant in Penang, about 200 miles north of Kuala Lumpur.



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

4. Amsteel Mills Sdn. Bhd.

Amsteel has its corporate office and steel plant in Banting, Selangor, about 40 miles west of Kuala Lumpur. Amsteel also has another steel plant in Johore, about 300 miles south of Kuala Lumpur.

5. Megasteel Sdn. Bhd.

Megasteel has its corporate office and steel plant in Banting, Selangor, about 40 miles west of Kuala Lumpur.

Amsteel and Megasteel are part of The Lion Group, but they are separate operations located in close proximity to each other.

2.3 MEETINGS IN MALAYSIA

All the meetings were scheduled during the week of April 10, 2006. Since Tuesday, April 11 was a public holiday (Prophet Mohammed's birthday), the meetings had to be held during the four working days in the week. PARS was advised by our local contact in Malaysia that it would be necessary to visit with the corporate office first before meeting with plant personnel. Except for Perwaja Steel and Malayawata Steel, the corporate office and the plant for all the other steel companies were in close proximity to each other. In the case of Perwaja Steel and Malayawata Steel, their corporate offices were in Kuala Lumpur while their steel plants were some distance away.

The following itinerary was developed to visit the corporate offices and steel plants of all five companies during the week of April 10.

Monday April 10; 11 am

Had a meeting in the corporate offices of Perwaja Steel at Maju Tower, 1001 Jalan Sultan Ismail, 50250 Kuala Lumpur. Met with Tuan Ngah Tuan Baru, Chief Operating Officer and his staff.

Monday April 10; 2:30 pm

Had a meeting in the corporate offices of Malayawata Steel at Wisma Ann Joo, Jalan Klang Lama, 4600 Petaling Jaya, Selangor. The meeting was to be with Mr. Teoh See Cheng, Vice President, Operations. But he was not available and the meeting was arranged with Mr. Tay Ewe Hoo, Vice President, Marketing, and his staff.

Tuesday April 11 was a national holiday. Drove to Penang that day



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

Wednesday April 12; 9 am

Had a tour of the Malayawata Steel plant in Prai, Penang. Had a meeting with the Assistant plant manager and his staff after the tour. The plant manufactures high yield bars, angles, flats, squares and wire rods. The main production process ranges from EAF steel making to rolling mills. The manufacturing facilities include one unit 80MT Electric Arc Furnace with Ladle Furnace and five Strand Continuous Caster, one unit Semi-continuous Bar Mill, one continuous Bar and wire Rod Mill. The plant is ISO 9002 certified.

Wednesday April 12; 2 pm

Had a meeting in the corporate office of Southern Steel. Later, met with Mr. Tan Kim Cheng, General Manager and his staff, followed by a plant tour. The plant produces mild steel round bars, high yield deformed bars, light section and wire rods ranging from very low carbon to high carbon and cold heading steel. The plant recently invested in a 1.3 MT billet making facility and a 1.3 MT of bar and wire rolling facilities. The plant is ISO 9002 certified.

Thursday April 13, 9 am

Had a meeting with Mr. Hassan Idriss, General Manager of the Perwaja Gurun Steel plant in Bedong, Kedah, and took a plant tour. The Gurun plant has a capacity of producing 1.5 million tons of steel annually. The rolling mills at this plant produce sections, H-beams and I-beams, bars, wire rods, channels, angles and nails. Perwaja has another steel plant in Kemaman, Terengganu; which could not be visited at this time.

Thursday April 13 1 pm. Drove back to Kuala Lumpur.

Friday April 14; 8 am

Had a meeting in the corporate office of Amsteel Mills in Banting, Selangor. Later met with plant personnel. The plant operates two steel mills, in Klang and Banting, a few miles apart. Both are modern plants with Electric Arc Furnaces of 85-ton and 160-ton capacity, 6-strand Continuous Casting Machines and Ladle Furnaces to produce billets for rolling into bars and wire rods. The Banting mill produces special grade bars and wire rods for automotive parts, mattress and mechanical springs, turning parts, wire ropes and other specialty uses. Another mill in Johore produces billets and bars, including angle bars and U-channels. This plant could not be visited at this time



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

Friday April 14; 11 am

Had a meeting in the corporate office of Megasteel in Banting, Selangor. Later met with plant personnel. Megasteel is a modern facility that is fully automated using state-of-the-art direct current Electric Arc Furnace – Compact Strip Production (EAF-CSP) process which incorporates the Thin Slab Casting technology developed by SMS in Germany. Megasteel also produces hot rolled coils, pickled and oiled. Its cold rolled mill has a capacity of 0.7 million metric tons and is capable of expanding to 1.45 million metric tons of cold rolled coils per annum.



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

3.0 SUMMARY OF FINDINGS

In all the meetings, there was interest in CANAL and a desire to obtain more information of the product and its applications. Some of the questions noted were:

- What is price per ton of CANAL?
- Where is CANAL being used?
- What is the particle size of the CANAL delivered?
- Where and how will CANAL be delivered?
- What technical support will be provided for clients?
- Does SMC have representatives in Malaysia or S.E. Asia?

Steel companies in Malaysia currently purchase synthetic slag primarily from South Africa and China. Because of recent shortages, synthetic slag has quadrupled in price in the past ten years.

In order to import and use CANAL, steel companies in Malaysia must obtain a permit from Jabatan Tenaga Atom dan Nuclear (the local equivalent of the USNRC). Preliminary indication is that the agency may waive permit requirements because of the low levels of naturally occurring radioactive elements in CANAL.

The agency uses several "Forwarding Agents" to facilitate the importation, shipping and handling of radioactive materials. The following agents were recommended:

Bax Global
Exel Logistics
Expeditors
Nippon Express

All these agents have representatives in the United States.



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

4.0 CONCLUSIONS AND RECOMMENDATIONS

There is compelling evidence that there is a market for CANAL in Malaysia. The steel manufacturing industry appears to be sophisticated and technologically advanced, and there is a desire to learn more about CANAL and how it could improve the quality of steel and make their operations more cost effective.

All the five steel companies that were contacted in this assessment have plans to grow in the next few years. Amsteel and Megasteel are two of the most advanced and fastest growing steel companies in Malaysia. Both companies are part of The Lion Group, and therefore can conceivably be approached jointly. It is recommended that these two companies be offered samples of CANAL, at no cost (or minimal cost) for testing and use at their facilities.

PARS understands that SMC has obtained, in the past, the necessary permits from the Nuclear Regulatory Commission (NRC) to ship CANAL overseas. In Malaysia, the applicable permits can be readily obtained through "Forwarding Agents" that work with steel companies.



REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA

PARS

ATTACHMENT 1

“SALES PITCH”

CANAL – Slag Fluidizer

CANAL is a ferrocolumbium slag that is an important part of making steel quality. CANAL removes unwanted oxides, sulfides, nitrides and phosphides; it also provides a cover to protect refined steel from reoxidation and nitrogen and hydrogen pickup. CANAL is also used as the basis for effective calcium treatment to improve castability and yields for continuous casters.

ADVANTAGES of CANAL

- Refractory Protection
- Energy Savings at Ladle Furnaces
 - Consistent Chemistry
 - Faster Steel Refining Times
- Good Sulfur and Inclusion Removal
 - Improves Castability – Yields
- Application for Aluminum and Silicon Killed Grades

Composition	Specification	Typical
C	0.10 % max	0.03 %
S	0.10 % max	0.50 %
Al ₂ O ₃	40-50 %	42.5 %
CaO	30-35 %	32.5%
MgO	14-18 %	16.3 %
FeO	1 % max	0.3 %
SiO ₂	1% max	0.3 %
P ₂ O ₅	0.1 % max	0.5 %
TiO ₂	1.5 – 3.5 %	2.3 %
ZrO ₂	1.5 % max	0.75 %

For Further Information, Contact

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

ATTACHMENT 2

MSDS FOR CANAL

SHIELDALLOY METALLURGICAL CORPORATION
 12 WEST BOULEVARD
 NEWFIELD, NJ 08344

Company Contact: ENVIRONMENTAL MANAGER
 Telephone Number: (609)692-4200

Emergency Contact: CHEMTREC
 Emergency Phone Number: (800)424-9300

SECTION #1 - IDENTIFICATION

Product: CANAL

Product Code: 1080

Synonyms: CALCIUM ALUMINATE
 PC1080

HMIS Hazard Rating - Health: 1 Slight
 - Fire: 0 Negligible
 - Reactivity: 0 Negligible
 - PPE: X

CHEMICAL FORMULA: FERROCOLUMBIUM SLAG ANALYSIS

CaO	MgO	Fe2O3	Al2O3	SiO2	Nb2O5	NiO
12-40	10-30	0-2	30-50	0-20	0-5	0-0.5

SECTION #2 - HAZARDOUS CHEMICAL COMPONENTS

Component: URANIUM
 CAS Number: 7440-61-1
 NIOSH 0.2 mg/m3
 OSHA 0.2 mg/m3
 IDLH 30 mg/m3

HAZARDOUS COMPONENTS OF MIXTURE: NONE.

SECTION #3 - PHYSICAL DATA

Melting Point: 1400°C
 Vapor Pressure: EFFECTIVELY 0 @ 20°C
 Specific Gravity: 2-3
 Solubility (H2O): INSOLUBLE/NEGLIGIBLE

Appearance

HARD GRAY LUMPY MATERIAL

Odor

NO ODOR.

SECTION #4 - FIRE FIGHTING & EXPLOSION DATA

Flash Point: NONE°F

Lower Explosive Limit (%): NOT FLAMMABLE
 Upper Explosive Limit (%): NOT FLAMMABLE

Fire and Explosion Hazards

NOT FLAMMABLE.

Material Safety Data Sheet CANAL	Page: 2 Rev. Date 11/30/94
-------------------------------------	----------------------------------

SECTION #5 - EXPOSURE EFFECTS and FIRST AID

Route of Exposure - Inhalation

EXCESSIVE INHALATION MAY CAUSE LUNG AND LYMPH NODE DAMAGE.

First Aid - Inhalation

IF EXCESSIVE DUST QUANTITIES ARE INHALED, MOVE THE EXPOSED PERSON TO FRESH AIR. SEEK MEDICAL ATTENTION.

Route of Exposure - Skin

IF POWDER IS EITHER SEGREGATED FROM THE SLAG OR GENERATED BY GRINDING THE SLAG, AND THE POWDER IS WETTED WITH LIMITED QUANTITIES OF WATER, THE SLURRY MAY BE ALKALINE WHICH CAN BE A SKIN IRRITANT.

First Aid - Skin

PROMPTLY WASH THE CONTAMINATED SKIN WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND WASH WITH SOAP AND WATER.

Route of Exposure - Eyes

DUST MAY CAUSE IRRITATION TO EYES. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH THIS MATERIAL.

First Aid - Eyes

IMMEDIATELY FLUSH THE EYES WITH CLEAR WATER FOR 15 MINUTES, OCCASIONALLY LIFTING THE LOWER AND UPPER LIDS. SEEK MEDICAL ATTENTION.

First Aid - Ingestion

IF MATERIAL HAS BEEN SWALLOWED SEEK MEDICAL ATTENTION IMMEDIATELY.

Miscellaneous Toxicological Information

EXPOSURE LIMIT VALUE(S): NEITHER OSHA NOR ACGIH LIST THESE SLAGS. SMC RECOMMENDS THAT USERS AVOID BREATHING ANY NUISANCE DUST OVER 5MG/M3 RESPIRABLE SIZES.

PRIMARY ROUTE(S) OF EXPOSURE: INHALATION OR SKIN CONTACT WITH MOISTENED SLAG.

CARCINOGENICITY RATING: THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, THE NATIONAL TOXICOLOGY PROGRAM AND OSHA HAVE NOT REPORTED THE INGREDIENTS HEREIN AS CARCINOGENS.

SECTION #6 - REACTIVITY & POLYMERIZATION

Stability: STABLE

SECTION #7 - SPILL, LEAK, & DISPOSAL PROCEDURES

Steps to be Taken in The Event of Spills, Leaks, or Release

SWEEP UP, AVOID NUISANCE DUST.

Waste Disposal Methods

FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS.

SARA Title III Notifications and Information

=====
Material Safety Data Sheet

Page: 4
Rev. Date
11/30/94
=====

CANAL
=====

=====
SECTION #8 - SPECIAL PROTECTIVE MEASURES
=====

Ventilation

USERS SHOULD NOT PERMIT DUST EXPOSURE OVER 5MG/M3 RESPIRABLE DUST.

Eye Protection

WEAR SAFETY GOGGLES WHEN WORKING WITH MATERIAL AND HAVE AN EYE WASH STATION AVAILABLE.

Skin Protection

WEAR PROTECTIVE CLOTHING. REMOVE CONTAMINATED CLOTHING AND WASH CLOTHES AND SKIN WITH SOAP AND WATER.

Respiratory Protection

IF SLAG DUST EXCEEDS 5MG/M3 IN THE USER'S AIR, HE SHOULD WEAR A NIOSH APPROVED RESPIRATOR.

=====
SECTION #9 - SPECIAL PRECAUTIONS - STORAGE & HANDLING
=====

Storage & Handling Conditions

SAFE HANDLING, USE AND STORAGE: This product may contain Uranium and Thorium, however at the concentration of approximately 0.5%

=====
SECTION #10 - SHIPPING INFORMATION
=====

Proper Shipping Name: ORE, NOI, NMEC 48390-1
=====

=====
DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES
=====

THE DATA IN THIS MATERIAL DATA SHEET RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED HEREIN AND DOES NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY PROCESS. THE INFORMATION SET FORTH HEREIN IS BASED ON TECHNICAL DATA THAT SHIELDALLOY BELIEVES TO BE RELIABLE. IT IS INTENDED FOR USE BY PERSONS HAVING TECHNICAL SKILL AND AT THEIR OWN DISCRETION AND RISK. SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, WE MAKE NO WARRANTIES, EXPRESSED OR IMPLIED, AND ASSUME NO LIABILITY IN CONNECTION WITH ANY USE OF THIS INFORMATION. NOTHING HEREIN IS TO BE TAKEN AS A LICENSE TO OPERATE UNDER OR A RECOMMENDATION TO INFRINGE ANY PATENTS. ANY USE OF THESE DATA AND INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS

ATTACHMENT 1

17. Description	18. Max Element Weight	19. Max. Wt. %	20. Max. Isotope Weight	21. Unit
prefused ceramic material that results from ferrocolumbium production				
Al ₂ O ₃	20,000 lbs.	50%	stable	n/a
CaO	16,000 lbs.	40%	stable	n/a
MgO	8,000 lbs.	20%	stable	n/a
Cb ₂ O ₃	800 lbs.	2%	stable	n/a
TiO ₂	1,200 lbs.	3%	stable	n/a
source material (natural uranium and natural thorium - Th-232, U-238, U-235)	184 lbs.	.46%	4588	ppm
natural thorium (Th-232)	139 lbs.	.35%	3470	ppm
natural uranium (U-238)	44 lbs.	.11%	1110	ppm
natural uranium (U-235)	0.31 lbs	.0008%	8	ppm



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

ATTACHMENT 3

**“SYNTHETIC SLAGS FOR STEEL MAKING” BY
MICHAEL WILLIAMS**

SYNTHETIC SLAGS

FOR

STEELMAKING

Michael Williams
Shieldalloy Metallurgical Corporation

Steelmaking Slags

Slags in the steelmaking process are complex single phase solutions in the molten state and multi-crystalline phases in the solid state. They serve to collect harmful impurities, provide a cover for the refined steel, and hopefully have minimal wear on refractories. By nature, they are less dense than steel which allows secondary refining to further improve metal quality by gathering inclusions that float out. The three properties of slag that we are interested in are: a) composition, b) melting point, and c) viscosity.¹

Since steelmaking slags are mostly composed of oxides, fluorides, aluminates, and silicates, it is difficult to find phase diagrams that characterize a specific composition. Fortunately, in practical steelmaking, it is not crucial that we know all the compounds and complexes that are formed in slags. In steelmaking slags we will generally find CaO, MgO, SiO₂, Al₂O₃, FeO, and MnO. Obviously, there are numerous other minor components but they have generally little effect on slag characteristics so we can discount them. One of our other objective for synthetic slags is extending refractory life, so calcium fluoride is eliminated from the slag making additives. By minimizing carryover slags from the furnaces to the tap ladles, we can also control the amount of FeO and MnO. Today's practices for aluminum killed and silicon killed steels also insures that FeO and MnO levels are relatively low (<6%) in the final slag compositions. That leaves us with the task of characterizing a CaO - Al₂O₃ - SiO₂ - MgO -slag. Unfortunately there are a limited number of phase diagrams of CaO - Al₂O₃ - SiO₂ systems at a specific MgO composition (Figure 1). MgO's presence in the slag composition is important and its primary function is refractory protection.

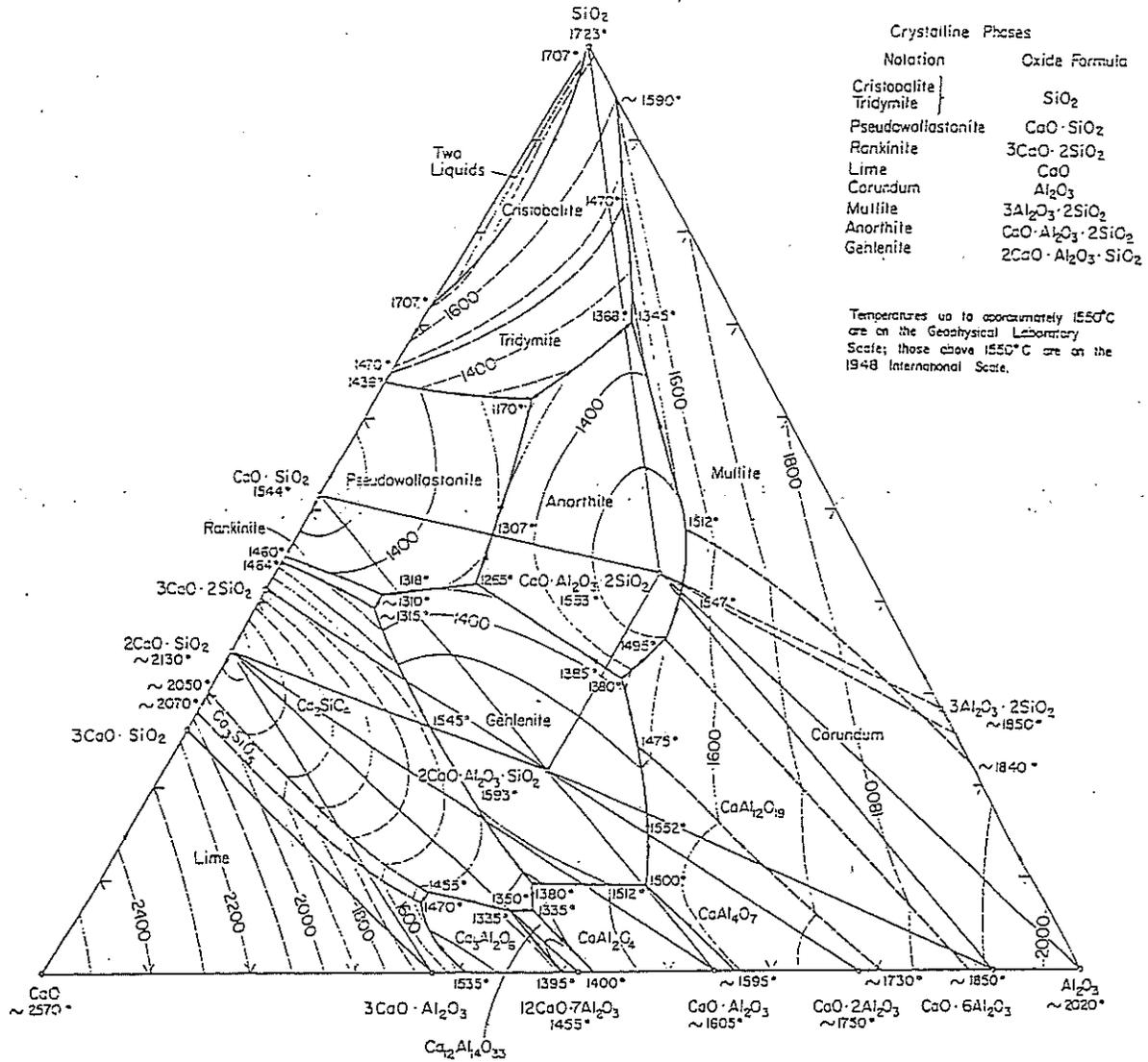


FIG. 630.—System CaO-Al₂O₃-SiO₂; composite.

E. F. Osborn and Arzulf Muan, revised and redrawn "Phase Equilibrium Diagrams of Oxide Systems," Plate 1, published by the American Ceramic Society and the Edward Orton, Jr., Ceramic Foundation, 1960.

Figure 2

CaO - Al₂O₃ - SiO₂ System³

Region x is beneficial for AK steel since it has the best sulphide capacity⁴, melting points below steelmaking temperatures, compositions compatible with calcium treatment, and cause minimal wear on most ladle refractories. AK steels for galvanizing, tin plating, and paint adherence have low Si requirements and therefore the residual SiO₂ in the carry over slag must be kept low. It is possible in region x (Figure 3) to achieve a fluid slag with less than 10% SiO₂ and still have good sulphide capacity (Figure 4).⁴

Secondary steelmaking LMFs are nothing more than low powered EAFs. They operate by heating up the slag which in turn heat up the steel. This is to prevent reoxidation and recarburization, along with a cover protection from nitrogen and hydrogen. If the slag is crusty and viscous, energy must first be expended to fluidize the slag at a higher temperature before the reheat and inclusion absorption process by the slag can occur.⁵

Often slag viscosity is confused with its melting point since temperature does affect it, but it is possible to lower a slag's viscosity without changing its melting point (Figure 5).

We are familiar with the effects of CaF_2 when it is added to crusty and viscous slag. Unfortunately, we also know what it does to our ladle slag lines. Not only does CaF_2 lower the slag's melting point, it also weakens the $\text{CaO} - \text{Al}_2\text{O}_3 - \text{SiO}_2$ bonds - hence the lower viscosities that are observed. This is the same mechanism that erodes ladle slag lines.

Since the Al and Si additions are process determined, there may not be enough Al_2O_3 and SiO_2 generated to place the slag composition in the beneficial range. This is when a prefused synthetic slag addition can be used to modify the process slag into beneficial range. Synthetic slags can be engineered with the proper $\text{CaO} - \text{Al}_2\text{O}_3 - \text{SiO}_2$ balance, taking into account the oxidation products of the AK steelmaking process, to achieve final ladle slags that have a good sulphide capacities, ability to absorb inclusions, low viscosities, lower melting points than steelmaking temperatures, and have minimal refractory wear. The properly engineered synthetic slag should be prefused to minimize energy consumption at LMFs and possess a low melting point so it can be introduced into the tap ladle early to take advantage of a longer refining period.

Table 1 shows the analyzes of two slag samples, one from the EAF melt down slag and the other from the finish LMF slag. The samples were analyzed by X-Ray Fluorescence and Leco C, S analyzer.

IMEXA's EAF and LMF Slag Compositions

<u>Element/Compound</u>	<u>EAF Slag (%)</u>	<u>LMF Slag (%)</u>
Al ₂ O ₃	7.19	23.81
CaO	36.92	51.77
C	0.023	0.033
FeO	21.75	0.58
MgO	13.07	9.81
MnO	0.75	0.06
P ₂ O ₅	0.77	0.16
SiO ₂	15.97	5.29
S	0.027	0.351

TABLE 1

The EAF slag is highly oxidized with 21.75% FeO which gives it a high P₂O₅ absorption capacity. The CaO and MgO ratio presumably comes from the use of dolomitic lime. If not, the MgO would come from furnace refractory erosion. The Al₂O₃ and SiO₂ content is probably from the DRI, but again, if not, it may be from the furnace refractory. Since 500 kg of this slag carries over into the tap ladle we would calculate the amount of Al necessary to reduce the FeO to Fe as follows:

theoretically

500 kg (EAF slag) x 21.75% = 108.75 kgs FeO

1 kg of FeO requires 0.25 kg of Al for reduction

Therefore Al requirements = 108.75 kg of FeO x 0.25 = 27.1875 kg

Synthetic Slag Fluidizer's Composition

<u>Compound</u>	<u>Composition (%)</u>
Al ₂ O ₃	43.0
CaO	32.5
MgO	16.3
SiO ₂	0.3
FeO	0.3
Minor Oxides	Balance

Melting point - approximately 1400°C.

Table 2

The application rate selected for the synthetic slag fluidizer would be 5 kg/ton of steel or roughly 1 MT per heat. It should be added either in the bottom of the tap ladle or at one quarter full, along with 250 kg of Al, 500 kg of lime, Mn, and microalloying elements. The fluorspar addition is to be eliminated. This would result in the following predicted composition:

Ladle Slag Composition with
Synthetic Slag Fluidizer

<u>Compound</u>	<u>Composition(%)</u>
Al ₂ O ₃	37.5
CaO	40.4
MgO	9.1
SiO ₂	3.2

Table 3

References

- 1) Schuhmann, R., Metallurgical Engineering, Vol. 1
Engineering Principles, Addison - Wesley , 1952
- 2) Kozakevitch, P.; Revue Metall. 1954
- 3) Phase Diagram for Ceramists, Vol. 1, The American Ceramic Society, Inc. 1964
- 4) Richardson, F.D., Physical Chemistry of Melts of Metallurgy, Vol. 2
Academic Press, London, U.K., 1974
- 5) Electric Furnace Steelmaking, Vol 2, Theory and Fundamentals
Iron and Steel Division, American Institute of Mining,
Metallurgical and Petroleum Engineers, 1963
- 6) Hille, K.F., Papay, F.R., Slag Control Techniques for High Quality Steel
Steelmaking Conference Proceedings, 1991
- 7) Williams, M., Synthetic Slag Practice for Steelmaking at IMEXA, Private Communicade,
August 31, 1994



**REPORT
PRELIMINARY ASSESSMENT
MARKET POTENTIAL FOR CANAL IN MALAYSIA**

PARS

**ATTACHMENT 4
BACKGROUND INFORMATION ON MAJOR STEEL
COMPANIES IN MALAYSIA**

Perwaja Steel Sdn Bhd

Company Details

Full Business Name : Perwaja Steel Sdn Bhd
Company Registration No. : 187922-H
Business Address : Level 23, Maju Tower, 1001 Jalan Sultan Ismail, 50250 Kuala Lumpur, Malaysia
Phone : Corporate Office: 603-27728888 / Kemaman Plant : 609-8631435 / Gurun Plant : 604-4688466
Fax : Corporate Office: 603-27728899 / Kemaman Plant : 609-8631877 / Gurun Plant : 604-4688541
Email : admin@perwaja.com.my
Website : <http://www.perwaja.com.my>

Business Details

Categories : Semi Finished : DRI
Semi Finished : Billet
Rolled Products : Bars
Rolled Products : Sections
Rolled Products : Wire Rod

Factories Address : • 24007 Kemaman, Terengganu, Malaysia • Gurun Industrial Area, 08100 Bedong, Kedah, Malaysia

Product Manufactured : Steel billet, blooms, beam blanks, direct reduced iron, steel sections, steel bars, wire rods, nails

Established on : 1982
Countries of export : Indonesia, Taiwan, Vietnam, Singapore, USA, Thailand, Philippines
No. of Employees : 1300

Business Inquiries : **Group Managing Director**
Dato' Abu Talib Mohamed

Chief Operating Officer
Tuan Ngah Tuan Baru

Logistics (Advisor)
Capt. (R) Mohd Yunus Alias

PERWAJA STEEL SDN BHD

Perwaja Steel Sdn. Bhd. is owned by Maju Holdings Sdn. Bhd. It is one of the largest iron and steel producers in Malaysia. Its steel making plant, located in Kemaman, Terengganu, has a capacity of producing 1.5 million tonnes of steel annually. Main products are billets, beam blanks and blooms. Its rolling mills in Gurun, Kedah produce sections, H-beams and I-beams, bars, wire rods, channels, angles and nails.

Perwaja Steel also has the capacity of producing 1.2 million tonnes of Direct Reduced Iron (DRI) annually, through its DRI plant, located in Kemaman, Terengganu. The DRI plant is currently being upgraded to produce 1.8 million tonnes of DRI annually.

As one of Malaysia's largest steel producers, Perwaja Steel always promotes the use of steel in construction and other industries. Perwaja Steel provides advisory and promotional services to the various steel associations in Malaysia through the Malaysian Structural Steel Association (MSSA), the Malaysian Iron and Steel Industry Federation (MISIF) and the Federation of Malaysian Manufacturers (FMM).

The Perwaja Steel Board of Directors is composed of professionals who remain the driving force behind the success of the organisation

Tan Sri Abu Sahid bin Mohamed

Group Executive Chairman
Maju Holdings Sdn. Bhd.

Dato' Abu Talib bin Mohamed

Group Managing Director
Maju Holdings Sdn. Bhd.

Dato' Mohamed Fuad bin Yon

Director

Mohd. Fauzi bin Yon

Director

PRODUCTS

Direct Reduced Iron (DRI)

DRI is produced using the latest HyL process at the Kemaman plant. The DRI is either used internally for billet production or is transported out for sale to local and foreign buyers.

Chemical Composition

Total iron	90.0% min
Metallic iron	83.0% min
Metallisation	92.0% min
CaO / SiO ₂	0.70%
C	2.0 – 3.0% (Typical 2.4%)
P	0.10%
S	0.01%
Gangue	3.65%

Physical Properties

DRI size	6.3mm min diam.
Size distribution	6.3mm, 3% max.
15.9mm	10% max
6.3mm	3% max
Bulk density	1.65 minimum
Compressive strength average (kg/piece)	90 minimum

Billets

Billets are produced in the steelmaking plant, using DRI as the main raw material together with scrap.

Billets are produced in various sizes :

- 100mm x 100mm
- 120mm x 120mm
- 150mm x 150mm
- 200mm x 200mm

The chemical composition of the billets depends on the end use as given in the Table below.

	C	Si	Mn	P	S	Equivalent Standards	Grade
Deformed Bar	0.05 – 0.25	0.10 – 0.35	0.30 – 0.60	<0.050	<0.050	MS 146	G460
	0.20 – 0.35	0.15 – 0.35	1.00 – 1.60	<0.050	<0.050		G500
Drawing Quality	≤0.08	≤0.03	≤0.06	≤0.025	≤0.025	JIS G 3506	SWRM 6R
	≤0.10	≤0.03	≤0.60	≤0.025	≤0.025	JIS G 3507	SWRM 6R
Welding Quality	0.06 – 0.10	0.10 – 0.20	0.30 – 0.60	≤0.030	≤0.030	JIS G 3508	SWRM 8K
	0.07 – 0.09	0.65 – 0.90	1.00 – 1.50	<0.015	<0.015		AWS E70S-4 AWS E70S-6

(1) Mn (max) depends on $CE = 0.51 = C + 9Mn/6 + Cr + Mo + V / 5 + (Ni + Cu)/15$

Beams & Sections

The types of structural steel that can be produced include H-sections, I-sections, C-channels, equal leg angles and H-piles. The range of available sizes (in mm) are summarised below.

H sections	150mm x 150mm ~ 600mm x 300mm
I sections	200mm x 100mm ~ 600mm x 190mm
C channels	150mm x 75mm ~ 380mm x 100mm
Angles	125mm x 125mm ~ 200mm x 200mm

Product Range:

H-Beams	150mm x 150mm to 350mm x 350mm and 200mm x 100mm to 600mm x 300mm
I-Beams	200mm x 100mm to 600mm x 190mm
Channels	150mm x 75mm to 380mm x 100mm
Angles	125mm x 125mm to 200mm x 200mm

Bars and Wire Rods

The bars and wire rods are produced at the Gurun Plant.

Reinforcement Bars

High Tensile Deformed Bars

Standard length 12 metres

Size range 10mm to 40mm diameters

Mild Steel Plain Round Bars

Standard length 12 metres

Size range 10mm to 40mm diameters

The steel bars produced by Perwaja conform to **Malaysian Standard MS 146 2000** for:

Grade 250 N/mm² Mild Steel Round Bar

Grade 460 N/mm² High Tensile Deformed Bar

Grade 500 N/mm² High Tensile Deformed Bar

Perwaja Steel also produces bars meeting the **BS 3339 1988** specifications.

Wire Rods

Sizes available

Round 5.5mm to 14.0mm (Sizes up to 45mm can be supplied on request)

Deformed (Grade 460) 10.0mm, 12.0mm

Available grade

Round Killed steel, JIS G3505:1980 SWRM 10K – 12K

(LC quality) AISI / SAE 1010K – 1012K

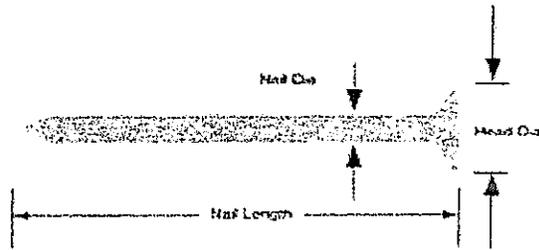
Deformed Mild steel and High tensile with Vanadium

Weight and Packing

In standard weight coils of about 1000kg each (max) securely strapped

Nails

Two types of nails are produced at the Gurun Plant.

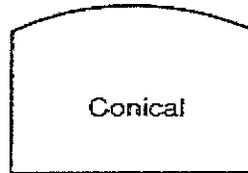
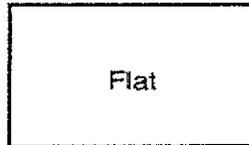


Sinker Nails

Length	38.0mm – 82.5mm
Diameter	2.1mm – 3.76mm
Head diameter	5.16mm – 8.74mm
Packing	12kg / carton for local market 50lb (22.68kg) / carton for export market

Collated Nails

Length	32.0mm – 75.0mm
Diameter	2.1mm – 3.1mm
Pitch	6.0mm – 8.0mm
Nails per coil	200 – 400



Accreditation

- ISO 9001 : 1994 by Sirim
- BS EN 9002 : 1994 by BSI, UK

Business Address:

Corporate Office:
Lot 2.21 Lion Industrial Park,
40300 Shah Alam, PO Box 7587,
40720 Shah Alam, Selangor

Telephone Number:
Corporate Office: 603-5119100
Kemaman Plant: 609-8631435
Gurun Plant: 604-4688466

Telefax Number:
Corporate Office: 603-5119200
Kemaman Plant: 609-8631877
Gurun Plant: 604-4688541

Email:
Perwaja@tm.net.my

Factory Address:
Kemaman Plant:
PO Box 61, 24007 Kemaman, Terengganu

Gurun Plant:
Gurun Industrial Area,
PO Box 25, 08100 Bedong, Kedah

Established:
1982

Business Enquiries:
Dato' Abu Talib Mohamed - Chief Executive Officer
Capt @ Mohd Yunus Alias (Director – Logistics) - Head of Purchasing
Tuan Ngah Tuan Baru (Director – Business Development & Marketing) - Head of Export/Sales
Mr Abdul Malik Omar (Director of Operations) - Head of Operations
Mr Johan Mansor (General Manager, Kemaman) - Head of Factory
Mr Abdul Hali Abdullah (General Manager, Gurun) - Head of Factory

Number of Employees:
2,435

Ownership:
100% Bumiputera, 100% Malaysian

Annual Capacity:
Kemaman - 800,000MT Billet, 700,000MT Beam Blanks/Bloom
Gurun - 450,000MT Bars & Wire Rod Mill, 700,000MT Beam & Section Mill
Factory A - 108MT Straightening, 144,000MT Stretching, 96,000MT Cold Ribbing,
38,000MT Nail, 60,000MT Wire Mesh

Annual Sales:
RM465 million

Products Manufactured:

- Reinforcement Bars
- Structural Sections
- Hot Rolled Steel Bars
- Mild Steel Wire (Cold Ribbing)
- Steel Fabric
- Wire Rod
- Beam &Section
- Nails

Material:

Bloom & Beam Blanks

Main Production Process:

Direct Reduction Plant, EAF & Continuous Casting, Rolling Mill

Manufacturing Facilities:

Two DC Furnaces, Three AC Furnaces, Three Continuous Casting M/C, One Bloom/Beam Blank Casting M/C, One Bar & Rod Mill, One Beam & Section Mill, One Stretching Factory, One Straightening Factory, One Cold Rolling Factory, One Nail Manufacturing Factory, Two Wire Mesh Factories

Testing Equipments:

Kemaman Plant:

- Gas Analysers, Steel Analysers, Tensile Tests M/C

Gurun Plant:

•Universal Milling Machine SU1250, Standard Tester TIGI25R, Hardometer HP0250, Eng Quench Unit Jomini, Electric Furnace FLO Temperature 1100, Balance Europe, Magnetic Crack Detector Minicev 800, Press 75 tonnes, Precision Grinding Machine, Furnace FT35, Metallurgical Microscope Optihot, Micro Scierometer Microscan OM, Motopol Automatic Specimen Preparation, Press New Met II, Precision Center Lift Alpha, Automatic Cut Off Machine, Machine for Marking Specimen, Cut Off Machine Super Brown, Universal Testing Machine 600 KN, Impact Value Pendulum 300J, Broaching Equipment, Tryo Stat F3-Q, Bar Bender, Weighing Machine, Universal Testing Machine (Bending), CNC Milling Machine, Harness Tester HRB & HRC, Surface Plate, Water Analysis Apparatus

Countries of Export:

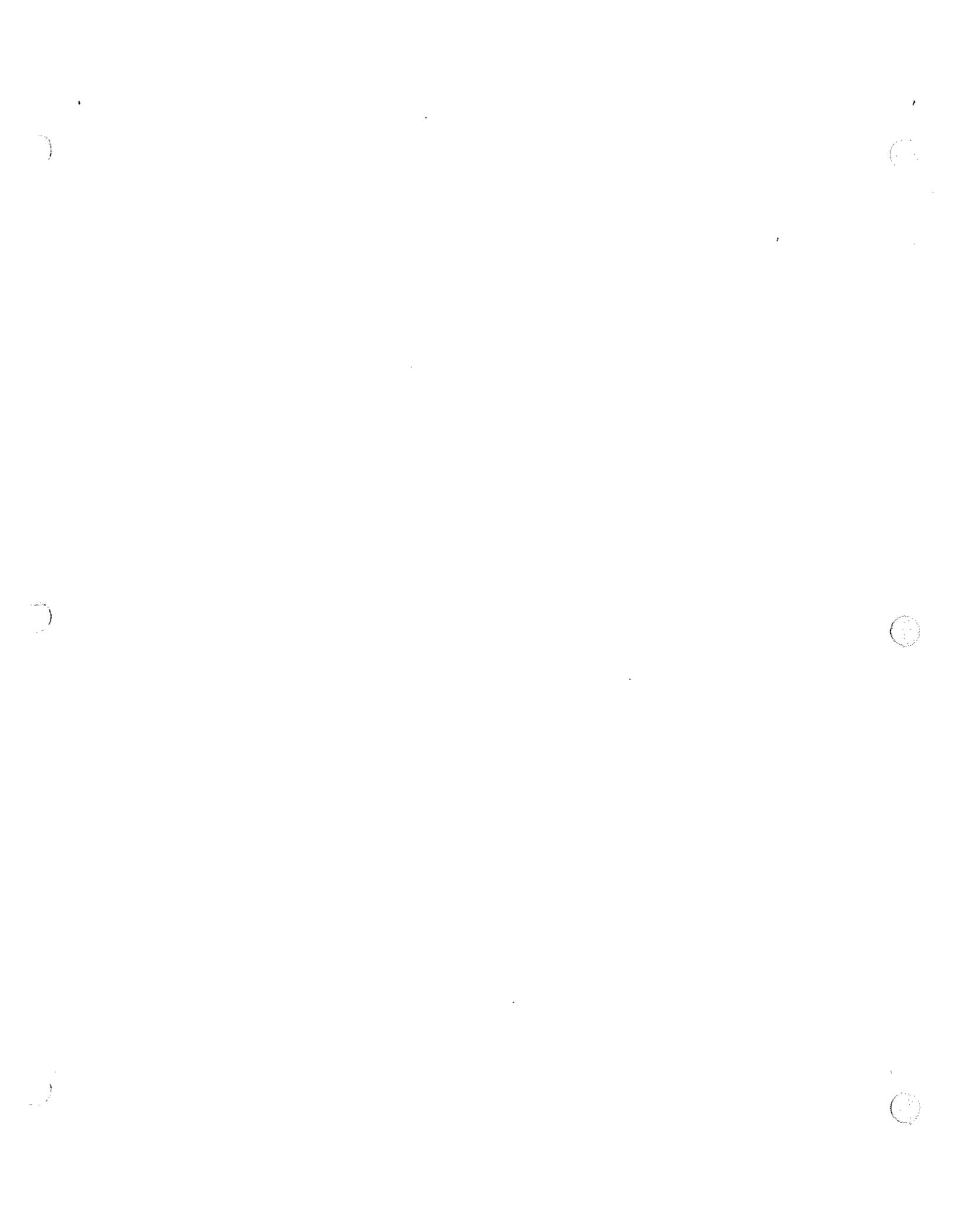
USA, Taiwan, Indonesia, Vietnam, Thailand, Singapore

Percentage of Export:

27% (1998)

Accreditation to Qualify Management System:

MS ISO9002:1994 by SIRIM, BS EN9002:1994



Malayawata Steel Berhad

Company Details

Full Name : Business Malayawata Steel Berhad
Company Registration No. : 4405-M
Business Address : 3rd Floor, Wisma Ann Joo, Lot 19391, Batu 81/2, Jalan Klang Lama, 46000 Petaling Jaya, Selangor, Malaysia
Phone : 604-3907297 (Procurement) 603-55482088 (Sales)
Fax : 604-3908863 (Procurement) 603-55485088 (Sales)
Email : teoh.see.cheng@malayawata.com.my / tay.ewe.hoo@malayawata.com.my
Website :

Business Details

Categories : Semi Finished : Billet
Rolled Products : Bars
Rolled Products : Sections
Rolled Products : Wire Rod

Factories Address : Lot 236, Prai Industrial Estate, 13600 Prai, Penang, Malaysia

Product Manufactured : Deformed high yield bars (8 to 40mm diameter), MS bars (8 to 32mm diameter), angles (38 to 65mm)/flats (4 to 12mm thick)/squares (9 x 9mm to 16 x 16mm), wire rods (5.5 to 16mm diameter)

Established on : 1961

Countries export : of Singapore, Vietnam, Indonesia, Myanmar, Bangladesh, Sri Lanka, Australia, New Zealand, Philippines

No. Employees : of 972

Business Inquiries : **President/CEO**
Dato' Lim Hong Thye

Vice President - Operations
Mr. Teoh See Cheng

Vice President - Marketing
Mr. Tay Ewe Hoo

MALAYWATA STEEL BERHAD

Established in 1961, Malaywata Steel Berhad is the nation's pioneer steel maker and the first integrated steel mill in South East Asia. Malaywata is the first steel mill in Malaysia to win the coveted NPC Productivity Award 2002, awarded by the Ministry of International Trade & Industry. In January 2004, Malaywata became the first steel mill in South East Asia to successfully obtain three certifications of internationally-acclaimed management systems, all at the same time, i.e. in Quality (ISO 9001:2000), Environmental, (ISO 14001:2004) and Occupational Safety & Health, (OHSAS 18001:1999) which we call the Integrated Management System (IMS). The Group's principal activities are selling and marketing of steel related products and the cultivation of oil palm and sale of oil palm produce. Other activities include renting out of machinery and property investment holding. The Group operates in Malaysia and other ASEAN countries.

Products Manufactured:

Industrial Gases (Nitrogen and Oxygen), Mild Steel Billets (100mm, 120mm, 150mm), SWRM 8K/10K/12K Billets (120mm and 150mm), SWRM 8K/10K/12K Wire Rods (JIS G3505:1996), Mild Steel Round Bar (MS 146:2000 (G250), BS 4449:1997 (Grade 250), High Yield Deformed Bars (MS 146:2000 (Grade 460 and, Grade 500, BS4449:1997 Grade 460B), Mild Steel Angle Bars (JIS G3101:1995 Grade SS400 and Grade SS490), Mild Steel Flat Bars (JIS G3101:1995 Grade SS400 and Grade SS490), Wire Rod Size 5.5, 6.5, 7.6, 8, 9, 10 and 11mm

Business Address:

PO Box 60,
12700 Butterworth, Penang

Telephone Number:

604-3907144

Telefax Number:

604-3908863 / 3996571

Email:

teoh.see.cheng@malayawata.com.my;
tay.ewe.hoo@malayawata.com.my

Factory Address:

Lot 236, Prai Industrial Estate,
13600 Prai, Penang

Established:

1961

Business Enquiries:

Mr. Teoh See Cheng - Vice President (Operation)
Mr Tay Ewe Hoo - Vice President (Marketing)

Number of Employees:

830

Ownership:

7% Bumiputera, 70% Malaysian, (Incl. 30% Pernas International), 23% Foreign

Annual Capacity:

500,000MT

Annual Sales:

RM500 Million

Products Manufactured:

Deformed High Yield Bars (10 to 40mm Diameter), MS Bars, Angles (38 to 65mm), Flats (4 to 12mm thick), Squares (9x9mm to 16x16mm) & Wire Rods (5.5 to 16mm Diameter)

Materials:

Steel Scraps & Ferro - Alloys - For Round, Square, Angle Bars & Wire Rods
Hot Coils - For Light Sections (Angles & Channels) and Flat Bars

Main Production Process:

EAF Steel Making to Rolling Mills

Manufacturing Facilities:

One Unit 80MT DC Electric Arc Furnace with Ladle Furnace & 5 Strand Continuous Caster, One Unit Semi-Continuous Bar Mill, One Unit Continuous Bar & Wire Rod Mill

Testing Equipments:

ARC - Spark Spectrometer, Universal Testing Machine, Image Analyser

Accreditation to Qualify Management System:

Certified by BVQI, Standard ISO9002

http://www.tradenex.com/sites/malwata/f_main.htm



✓ **Southern Steel Berhad**

Company Details

Full Business Name : Southern Steel Berhad
Company Registration No. : 5283-X
Business Address : 2723 Lorong Perusahaan 12, Prai Industrial Estate, 13600 Prai, Penang, Malaysia
Phone : 604-3906540
Fax : 604-3908060
Email : chow.chonglong@southsteel.com
Website : <http://www.southsteel.com>

Business Details

Categories :
Semi Finished : Billet
Rolled Products : Bars
Rolled Products : Pre Bent Bars
Rolled Products : Wire Rod

Factories Address : 2436 Lorong Perusahaan 12, Prai Industrial Estate, 13600 Prai, Penang, Malaysia

Product Manufactured : Steel bar, wire rod, steel billet

Established on : 1963

Countries of export : Brunei, Thailand, Hong Kong, Taiwan, Vietnam, Bangladesh, Indonesia, Japan, Philippines, Singapore, USA and Canada

No. of Employees : 1206

Business Inquiries : **Chief Executive Officer**
Dato' Dr. Tan Tat Wai

Chief Operating Officer
Mr. Chow Chong Long

General Manager (Commercial)
Mr. Cheong Khai Kong

General Manager (Material Handling)
Mr. Tan Kim Cheng

General Manager (Purchasing)
Mr. Hew Yoon Huat

SOUTHERN STEEL BERHAD

Southern Steel Group is a leading Malaysian Steel Group with over 30 years of experience and expertise in steel products manufacturing. Its strong shareholder line-ups include Hume Ind. (a member of Hong Leong Group Malaysia) Natsteel Asia Ltd, and the founding business families based in Penang. Hong Leong and Natsteel Asia are among the top ten industrial conglomerates in Malaysia and Singapore respectively. Southern Steel quality products include mild steel round bars, high-yield deformed bars, light section and wire rods ranging from very low carbon to high carbon and cold heading steel. Southern Steel engages state-of-the-art technology, and a strictly enforced quality control system. Southern Steel is the first steel Mill group in Malaysia to be awarded the ISO 9002 certificate, a testimonial to its commitment to quality excellence. Its success is guided by a corporate philosophy whereby its people and business are committed to uphold integrity, competence and teamwork, and firmly believe in being innovative, technology driven and environmentally friendly.

Founded in 1963, Southern Steel Berhad has grown from a small galvanised iron sheet plant to a major steel manufacturing group. The Company has invested RM1.2 billion in 1.3 million MT on of billet making and 1,300,000 MT of bars and wire rod rolling facilities. Southern Steel Berhad is the first in Southeast Asia to supply high quality easy drawing wire rods with low scale loss to customers. The Company is also the first in Asia outside Japan to install the DC arc furnace. While Southern Steel Berhad's manufacturing operations employ the most advanced technology, its human resources are among the most skilled workforce in the industry.

Brisk Steel Products Sdn. Bhd. (BSP) was established in 1980 and became an associate of Southern Steel Group in 1995 when Southern Mesh was merged with it. It became a wholly owned subsidiary of Southern Steel Group in year 2000. Since the late eighties, BSP has been the leader in the local steel welded mesh industry with 60% market share. BSP has three manufacturing plants strategically located in Klang, Prai and Pasir Gudang with a combined production capacity of approximately 180,000MT per annum. It also has a sales office in Kuantan, Pahang Darul Makmur to cater for the east coast market. BSP is also the only wire mesh manufacturer to be awarded the prestigious ISO 9002 in all its three plants. The Company adheres to stringent product quality control and strong technical backup in meeting the requirements of projects of various complexities.

Southern Pipe Industry (M) Sdn. Bhd. was founded in 1967. It became an associate of Southern Steel in 1987 through the merger with Southern Steel's pipe operation. In 1989, it became a subsidiary of Southern Steel. It has since

then grown as a leading pipe manufacturer in the country producing a wide range of welder pipe including black pipe, conduit pipe, hot dipped galvanised pipe & in line hot dipped galvanised pipe. Its superior coated pipe has been well accepted in the United States, Canada and other developed countries in the Europe.

Southern Wire is the leading steel wire manufacturing company in Malaysia and in Asean. The Company has been in operations since 1969. It has been a fully owned subsidiary of Southern Steel Berhad since 1992. Southern Wire's range of steel countries. The products cover bedding & seating wire, automotive and industrial wire, wire rope, cable armouring wire, gabion wire, fencing wire, staple wire, stitching wire and so on. Southern PC Steel, the fully owned subsidiary of Southern Wire manufactures prestressed concrete strand, wire, wire and bar. In addition to being MS ISO9001:2000 certified and complying with SIRIM standards of Malaysia, Southern Wire's products also confirm to international quality standards such as API, Lloyds, ABS, ASTM and BS.

Product Specifications

Specifications of Wire Rod

Standard	Grade	C	Si	Mn	P	S	Cu	Al	Typical Tensile Range
Mesh									
JIS G 3505	SWRM 12K	0.10-0.15	0.10-0.30	0.30-0.60	0.040 max	0.040 max			420 - 520
Deformed Bar In Coil									
BS 4449:88	G460								
BS 4449:97	G460								
MS 146:2000	G460								
MS 146:2000	G500								
Drawing Quality									
JIS G 3506	SWRM 6R	0.08 max		0.60 max	0.40 max	0.40 max			370 max
JIS G 3507	SWRM 8R	0.10 max		0.60 max	0.40 max	0.40 max			380 max
JIS G 3508	SWRM 8K	0.10 max	0.10-0.20	0.30-0.60	0.030 max	0.035 max			370 - 450
	SSD 8	0.10 max	0.10-0.20	0.30-0.60	0.030 max	0.035 max			370 - 450
JIS G 3505	SWRM 10K	0.08-0.13	0.10-0.25	0.30-0.60	0.040 max	0.040 max			380 - 480
	SSD 10	0.08-0.13	0.10-0.25	0.30-0.60	0.040 max	0.040 max			380 - 480
	SSD 5	0.08 max	0.10 max	0.40 max	0.025 max	0.025 max			400 max
Poly Shaft									
	SD 1K	0.10 max	0.10-0.30	0.30-0.60	0.030 max	0.030 max			
	SD 2K	0.10-0.15	0.10-0.30	0.30-0.60	0.030 max	0.030 max			
	SD 3K	0.15-0.20	0.10-0.30	0.30-0.60	0.030 max	0.030 max			
	SD 3KM	0.15-0.20	0.10-0.30	0.60-0.90	0.030 max	0.030 max			
Steel Wool									
	SSU 8	0.06-0.11	0.10 max	0.8-1.0	0.04-0.08	0.025 max			440 - 520
Welding Quality									
JIS G 3503	SWRY 11	0.09 max	0.09 max	0.35-0.65	0.020 max	0.023 max	0.20 max		390 max
	SSW 5	0.08 max	0.10 max	0.40-0.60	0.030 max	0.030 max			410 max
	AWS ER70S-6	0.07-0.10	0.30-1.00	1.40-1.65	0.025 max	0.025 max	0.20 max		490 - 570

EM 12K	0.08 - 0.13	0.15 - 0.25	1.00 - 1.25	0.025 max.	0.025 max.				450 - 530
Bolt & Nut									
SSBN 5	0.10 max.	0.10 - 0.15	0.30 - 0.60	0.030 max.	0.035 max.				430 max.

Standard	Grade	C	Si	Mn	P	S	Cu	Al	Typical Tensile Range
Cold Heading Quality									
JIS G 3507	SWRCH 8R	0.10 max.	0.10 max.	0.60 max.	0.040 max.	0.040 max.			380 max.
JIS G 3507	SWRCH 10A	0.08 - 0.13	0.10 max.	0.30 - 0.60	0.030 max.	0.035 max.		0.02 min.	430 max.
JIS G 3507	SWRCH 18A	0.15 - 0.20	0.10 max.	0.60 - 0.90	0.030 max.	0.035 max.		0.02 min.	480 - 540
JIS G 3507	SWRCH 22A	0.18 - 0.23	0.10 max.	0.70 - 1.00	0.030 max.	0.035 max.		0.02 min.	500 - 560
JIS G 3507	SWRCH 38K	0.35 - 0.41	0.10 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.			630 - 710
JIS G 3507	SWRCH 40K	0.37 - 0.43	0.10 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.			630 - 710
	SSCH 22	0.18 - 0.23	0.10 max.	0.60 - 0.90	0.030 max.	0.035 max.			460 - 540
	SAE 1030	0.30 - 0.35	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.035 max.			590 - 710
High Carbon Quality									
JIS G 3506	SWRH 42B	0.39 - 0.46	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			720 - 820
JIS G 3506	SWRH 47B	0.44 - 0.51	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			750 - 850
JIS G 3508	SWRH 52B	0.49 - 0.56	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			850 - 950
JIS G 3506	SWRH 57B	0.54 - 0.61	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			890 - 990
JIS G 3506	SWRH 62B	0.59 - 0.66	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			950 - 1050
JIS G 3508	SWRH 67B	0.64 - 0.71	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			990 - 1090
JIS G 3506	SWRH 72B	0.69 - 0.76	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			1050 - 1150
JIS G 3506	SWRH 77B	0.74 - 0.81	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			1090 - 1190
JIS G 3506	SWRH 82B	0.79 - 0.86	0.15 - 0.35	0.60 - 0.90	0.030 max.	0.030 max.			1140 - 1240
JIS G 3506	SWRH 42A	0.39 - 0.46	0.15 - 0.35	0.50 - 0.60	0.030 max.	0.030 max.			720 - 820
JIS G 3506	SWRH 57A	0.54 - 0.61	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.030 max.			880 - 980
JIS G 3506	SWRH 62A	0.59 - 0.66	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.030 max.			950 - 1050
JIS G 3506	SWRH 67A	0.64 - 0.71	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.030 max.			990 - 1090
JIS G 3506	SWRH 72A	0.69 - 0.76	0.15 - 0.35	0.30 - 0.60	0.030 max.	0.030 max.			1050 - 1150
Hibond Quality									
	SSHB 30/PC	0.28 - 0.33	0.16 - 0.9	0.60 - 0.90	0.025 max.	0.025 max.	0.20 max.		670 - 770

Manufacturing Process:

- Wire Rod Mill
- Handling Storage
- Steel Making Plant

Business Address:
2723 Lorong Perusahaan 12,
Prai Industrial Estate,
13600 Prai, Penang, Malaysia

Telephone Number:
604-3906540

Telefax Number:
604-3908060

Website:
www.southsteel.com

Email:
admin@ssb.po.my

Factory Address:
2435 Lorong Perusahaan 12,
Prai Industrial Estate,
13600 Prai, Penang, Malaysia

Established:
1963

Business Enquiries:
Dr. Tan Tat Wai – Group Managing Director
Mr. Chow Chong Long – Chief Operating Officer
Mr. Kua Jit How – Deputy Chief Operating Officer

Number of Employees:
1,100

Ownership:
28.69% Foreign, 71.31% Malaysian

Annual Capacity:
Rolling Mills:
•Two bar mills (annual capacity 600,000 tonnes)
•Two bar/wire rod mills (650,000 tonnes)

Annual Capacity:
600,000 tonnes
•Two bar/wire rod mills (650,000 tonnes)

Annual Sales:
RM600 million

Materials:
Billets and Scrap

Secondary Prod. Process:
Cut & Bend

Countries of Export:

Brunei, Thailand, Hong Kong, Taiwan, Vietnam, Bangladesh, Indonesia, Japan,
Philippines, Singapore, USA and Canada

Accreditation to Qualify Management System:
Certified by BVQI, Standard ISO9002:1994 since 1993
Certified by SIRIM, Standard MS ISO9002 since 1996

http://www.tradenex.com/sites/SouSteel/f_main.htm

()

()

()

Amsteel Mills Sdn Bhd

Company Details

Full Name : Business Amsteel Mills Sdn Bhd
Company Registration No. : 63077-A
Business Address : Lot 1 Jalan Waja, Bukit Raja Industrial Estate, 41050 Klang, Selangor, Malaysia; Marketing Office: Wisma Lion, Lot 2319, Kawasan Perindustrian Olak Lempit, Mukim Tanjung Dua Belas, 42700 Banting, Selangor
Phone : 603-33412322/2323/2422; Marketing Office: 603-31822200
Fax : 603-33412354/2392/1942; Marketing Office: 603-31822356/2357
Email : koaybb@amsteel.com.my / wonglm@amsteel.com.my
Website : <http://www.lion.com.my>

Business Details

Categories : Semi Finished : HBI
Semi Finished : Billet
Rolled Products : Bars
Rolled Products : Wire Rod

Factories Address : 1. Steel Bar and Wire Rod Operations: Lot 1 Jalan Waja, Bukit Raja Industrial Estate, 41050 Klang, Selangor, Malaysia 2.HBI Operations: Ranca-ranca Industrial Estate, 87015 Labuan FT, Malaysia

Product Manufactured : Billets & high tensile deformed bar, round bar, wire rod, flat bar, angle bar, HBI

Established on : 1980

Countries export : of Steel Bar and Wire Rod Operations: Singapore, Vietnam, Philippines, Sri Lanka, Australia, New Zealand, Pakistan; HBI Operations: South Korea, Taiwan, Peoples' Republic of China, Indonesia, Australia and Thailand

No. Employees : of 1000

Business Inquiries : **Managing Director**
Mr. Toh Tuan Sun

Director of Operations
Mr. Lim Kay Meng

Head of Purchasing
Mr. Raymond Tan

Head of Export/Sales
Export: Steel Bar & Wire Rod
Mr. B B Koay

Local: Steel Bar & Wire Rod
Mr. Wong Leong Ming

HBI: Mr. Dominic Lu

AMSTEEL MILLS SDN BHD

Amsteel Mills Sdn Bhd, a member of The Lion Group commenced operations in 1978. It operates two steel mills, in Klang and Banting, both in Selangor, which are equipped with modern facilities comprising Electric Arc Furnaces of 85-ton and 160-ton respectively, 6-strand Continuous Casting Machines and Ladle Furnaces to produce billets for rolling into bars and wire rods. The Banting mill produces special grade bars and wire rods for automotive parts, mattress and mechanical springs, turning parts, wire ropes and other speciality uses. Another mill operated by the Group under the name of Antara Steel Mills Sdn Bhd in Johor produces billets and bars including angle bars and U-channels.

Antara Steel Mills also operates a HBI plant using the Midrex Direct Reduction technology in Labuan, East Malaysia. Most of the HBI is exported for steel making purposes with some used in Amsteel's own operations and in sister company, Megasteel Sdn Bhd.

Amsteel Mills has a steel making capacity of 4.9 million tonnes of billets per annum, and a rolling capacity of 1.9 million tonnes of steel bars and wire rods per annum.

LOCATION

Strategically located in the Klang Valley in peninsular Malaysia, its proximity to Malaysia's premier port, Port Klang, makes Amsteel Mills ideally located to cater to the requirement of domestic customers as well as international markets. Antara Steel Mills' location in the south of Peninsular Malaysia is also well placed to cater to southern region including Asean market.

A commitment towards prompt and reliable delivery services had enabled Amsteel Mills and Antara Steel Mills to gain both local and international acceptance and customer satisfaction in its products and services.

FIRST IN QUALITY

Combining human skills, experience, technology and equipment, Amsteel has established its name as one of the reputable mills in supplying quality steel products to the domestic and international markets.

Our commitment to quality is proven with our achievement in obtaining the ISO 9002 Quality System awarded by Standard Industrial Research Institute of Malaysia (SIRIM) in 1994 and British Standards Institute (BSI) in 1995.

STEELMAKING

The steel meltshop in Klang was established in 1982 with an 85-ton Electric Arc Furnace (EAF), subsequently upgraded to 100-ton, and a 6-strand Continuous Casting Machine (CCM) to produce billets. The Ladle Furnace was installed in 1985 as part of the mills' quality improvement programmes to produce high grade billets. The steel making facility in Klang has enabled Amsteel to achieve a billet production of 750,000 tonnes per annum.

Amsteel's new meltshop in Banting under Amsteel II comprises a 160-ton Direct Current EAF, LF, Vacuum Oxygen Degassing and a 6-strand CCM featuring full shroud or submerged nozzle operation (stopper rod system), mould EMS and hydraulic oscillators capable of producing 1.25 million tonnes of billets per annum. The 10m radius casting machine is designed for high speed casting of 130mm to 160mm billets in a wide range of special engineering steel including free-cutting and cold heading quality for the downstream industries.

ROLLING

Amsteel Mills rolling facilities consist of two Bar Mills and a Wire Rod Mill in Klang, and a Rolling Mill capable of producing both bars and wire rods in Banting. The two Rolling Mills in Antara Steel Mills produce steel bars and light sections such as angle bars, flat bars and U-Channels.

The Wire Rod Mill in Amsteel Klang is a tandem mill with finishing speed of 100 metres per second for 5.5mm rod. This mill incorporates the Stelmor Controlled air-cooling system with technologies from Danieli and Morgan for the production of cold-heading and high carbon wire rods.

In order to meet the demand for the quality bars and rods by the downstream industries, Amsteel II in Banting was commissioned in 2001. Its Rolling Mill incorporates some of the most advanced technologies, such as Walking Beam Furnace, High Pressure Descaler, Horizontal-Vertical Non-Twist Stands, Prefinishing Mill, Twin Module Fast Block running at 120 metres per second for 5.5mm rods, plus state-of-the-art Stelmor Controlled Cooling system.

The deformed bars produced range from 10mm to 50mm, while the round bars including for engineering applications range from 16mm to 50mm. The flat bar thickness is from 4.5mm to 12mm, and the angle bar sizes are from 25mm x 25mm x 2.8mm up to 100mm x 100mm x 12mm. The wire rods sizes are from 5.5mm to 20.5mm, with the bigger wire rods from the Garret Coiler ranging from 16mm to 32mm.

Products

Hot Rolled Mild Steel Flat Bars

Hot Rolled Steel Bars for the Reinforcement of Concrete

Low Carbon Steel Wire Rods

Amsteel Specification – Lows Carbon Steel Wire Rods for Fine Drawing

Rolled Carbon Steel for Cold Finished Steel Bars

Wire Rods for Core Wire of Welding Electrode

Amsteel's Specification – Wire Rods for Coare Wire of Welding Electrode

High Carbon Steel Wire Rods for Cold Heading and Cold Forging

Amsteels Specification – Steel Wire Rods for MIG/MAG Welding Solid Wire, Carbon Steel Filler Metals for Gas Shielded Arc welding

Free Cutting Steel (Leaded Rephosporised & Resulpherized Carbon Steel

Business Address:

Lot 1, Jalan Waja,
Bukit Raja Industrial Estate,
41050 Klang, Selangor.

Telephone Number:

603-3341 2322 / 603-3341 2323

Telefax Number:

603-3341 2354

Website:

www.lion.com.my

Factory Address:

* Steel Bar and Wire Rod Operations
Lot 1, Jalan Waja,
Bukit Raja Industrial Estate,
41050 Klang, Selangor.

*** HBI Operations**
Ranca-Ranca Industrial Estate,
PO Box 81555, 87015 Labuan F.T.

Business Enquiries:

Mr Eric Cheng Theng How - Chief Executive Officer
Mr Chen Kwong Fatt - Head Of Operations
Mr William Wong Pak Yii, Mr Koay Boon Bioh (Steel Bar & Wire Rod)- Head Of
Export/Sales
Mr Dominic Lu (HBI) - Head of Export/Sales

Number of Employees:
1,000

Ownership:
26.29% Bumiputera, 68.29% Malaysian, 5.42% Foreign

Annual Capacity:
Steel Making 750,000MT, Rolling 850,000MT, HBI 700,000MT

Annual Sales:
RM 900 million

Products Manufactured:
Deformed Bar, Round Bar, Wire Rod and HBI

Materials:
Scrap, Pig Iron, Iron Pellets and Iron Lump Ores

Main Production Process:
*** Steel Bar and Wire Rod Operations:**
Steel Making, Steel Refining, Billet Casting

*** HBI Operations:**
Midrex Direct Reduction Process

Secondary Prod. Process:
Wire Rod Straightening

Manufacturing Facilities:
*** Steel Bar and Wire Rod Operations:**
Electric Arc Furnace, Ladle Furnace, Continuous Casting Machine, Rolling Mills-Bar &
Wire Rods, Packaging System

*** HBI Operations:**
Shaft Furnace, Gas Reformer, Briquetted System, Blower System, Water System,
Material Handling System.

Testing Equipment:
Tensile Testing Machine, Spectrometer, Gas Analyser, Bending Test Machine,
Hardness Tester.

Countries of Export:
*** Steel Bar and Wire Rod Operations:**
Singapore. Vietnam. Philippines. Sri Lanka. Brunei and Mvanmar.

* HBI Operations:

South Korea, Taiwan, Peoples' Republic of China, Indonesia, Australia and Thailand.

Percentage of Export:

* Steel Bar and Wire Rod Operations - 10%

* HBI Operations - 90% and above

Accreditation to Quality Management System:

Certified by SIRIM, Standard ISO9002

http://www.tradenex.com/sites/amsteelmills/f_main.htm



Megasteel Sdn Bhd

Company Details

Full Business Name : Megasteel Sdn Bhd
Company Registration No. : 181104-T
Business Address : Lot 2319 Kawasan Perindustrian Olak Lempit, Mukim Tanjung Dua Belas, 42700 Banting, Selangor, Malaysia
Phone : Factory: 603-31816666/8866 Marketing: 603-31822200
Fax : Factory: 603-31816929-Marketing: 603-31822211/31822233
Email : soonml@megasteel.com.my / thamph@megasteel.com.my
Website : <http://www.lion.com.my>

Business Details

Categories : Semi Finished : Slabs
Rolled Products : CR
Rolled Products : HRC

Factories Address : As above

Product Manufactured :

- Hot rolled coils
- Pickled and oiled hot rolled coils
- Cold rolled coils

Established on : 1989

Countries of export :

No. of Employees : 1700

Business Inquiries : **Chief Executive Officer**
Tan Sri William Cheng

Marketing Director
Mr. Anthony Chin

General Manager ←
Mr. Khor Toong Yee

MEGASTEEL SDN BHD

Megasteel Sdn Bhd, a member of The Lion Group, is the first steel mill in Malaysia to produce flat steel products in the form of hot rolled coils. It has a total investment of RM3.2 billion and is located on a 500-acre site in Banting, Selangor. The mill is approximately 1.3 km long with a built-up area of 1.3 million square feet.

Megasteel is in close proximity to the Klang valley where 70% of the nation's consumers of hot rolled coils are located. Its strategic location near Port Klang helps to facilitate exports and lower transportation costs for the import of raw materials and export of finished coils. With a capacity of 2 million metric tons per annum, Megasteel's production helps to substitute imports and yield substantial foreign exchange savings.

The Megasteel mill is fully automated using state-of-the-art direct current Electric Arc Furnace-Compact Strip Production (EAF-CSP) process which incorporates the 'Thin Slab Casting' technology developed by SMS of Germany.

CSP - Thin Slab Casting technology is recognised worldwide as the latest technology to produce flat steel. It is able to produce high quality steel with significantly higher production yield and energy savings. More importantly, Megasteel is more environment-friendly as it recycles steel scrap and uses the clean raw material, Hot Briquetted Iron (HBI) in its EAF process. Megasteel is the only steel mill in the country to use this advanced CSP technology.

Megasteel also produces hot rolled coils, pickled and oiled. It has commenced production of its cold rolled mill with a capacity of 0.7million metric tons expandable to 1.45 million metric tons of cold rolled coils per annum.

In recognition of its quality products, Megasteel has received the JIS G 3101 : 1995 for Hot Rolled Steel Coil, JIS G 3131 : 1996 for Hot Rolled Mild Steel Coil and JIS G 3131 : 1990 for Hot Rolled Carbon Steel Coil certifications from SIRIM Berhad. Megasteel has also received the MS ISO 9001:2000, Lloyd's Register Plant Approval and American Bureau of Shipping Plant Approval certifications.

Hot Rolled Coil (HRC) and Cold Rolled Coil (CRC) specification

PRODUCT RANGE

Product	Thickness	Width	Coil Diameter	Coil Weight
Hot Rolled Coil	1.0mm - 21.0mm	900mm - 1575mm	Inner Diameter : 760mm	10 MT - 30 MT
Hot Rolled Coil Pickled & Oiled	1.5mm - 6.0mm	900mm - 1575mm	Inner Diameter : 610mm	8 MT - 30 MT
Cold Rolled Coil	0.35mm - 3.2mm	900mm - 1575mm	Inner Diameter : 508mm/610mm	

QUALITY SPECIFICATION

General Structure	JIS G 3101 JIS G 3131 ASTM BS EN 10025	SS330, SS400, SS490, SS540 SPHC, SHS A36, A1011, A572, A131, A283, A285, A516 S235J2G3, S275J2G3, S355J2G3
Gas Cylinder	JIS G 3116	SG255, SG295
Automobile Structure	JIS G 3113	SAPH370, SAPH400, SAPH440
Welded Structure	JIS G 3106	SM400, SM490
Corrosion Resistant Steel	JIS G 3125 ASTM	SPA4 A242
Pipes and Tubes	JIS G 3132 ASTM	SPHT1, SPHT2, SPHT3, SPHT4 A500
Line Pipes	API 5L	X42, X52, X56, X60, X65
Offshore Material	BS 7191	275C, 355C, 355D
Hot Rolled for Cold Rolled	SAE	1006, 1008
Chequered Plate	JIS G 3101 BS 4360	SS400 43A
Cold Rolled Coil	JIS G 3141	SPCC, SPCD, SPCC-1B

In addition to the above, Megasteel's products also adhere to other international standards eg. DIN, EN, AS etc

TEST METHOD

Test methods according to standard requirements following ASTM, JIS or equivalent standards

CERTIFIED BY

Hot Rolled Coil Applications

Gas Cylinders

Automotive Wheels

Galvanized Pipes

Marine Cargo Containers

Oil Filter Body

Cold Rolled Coil Applications

Safe Boxes

Steel Furniture

Cold Rolled Coils

Pipes and Tubes

Automotive Body Panels

Production Process Flow Chart and Main Equipment

All Megasteel products are tested to meet the physical, dimensional and application requirements in accordance with ASTM, BS, JIS and DIN or other standards:

Uniformity in quality, thickness and properties

Test and control with minimum tolerance and able to achieve uniformity across width and over the entire length of the strip

High quality of steel

Stringent control of steel cleanliness by addition of HBI, and using LF treatment, and Vacuum Degassing process (VD) for certain higher quality applications

Advanced testing and inspection facilities

To monitor every stage of the production process, QA tests cover:-

Chemical Test ③:

Every heat is checked for correct chemistry

Mechanical Test ④:

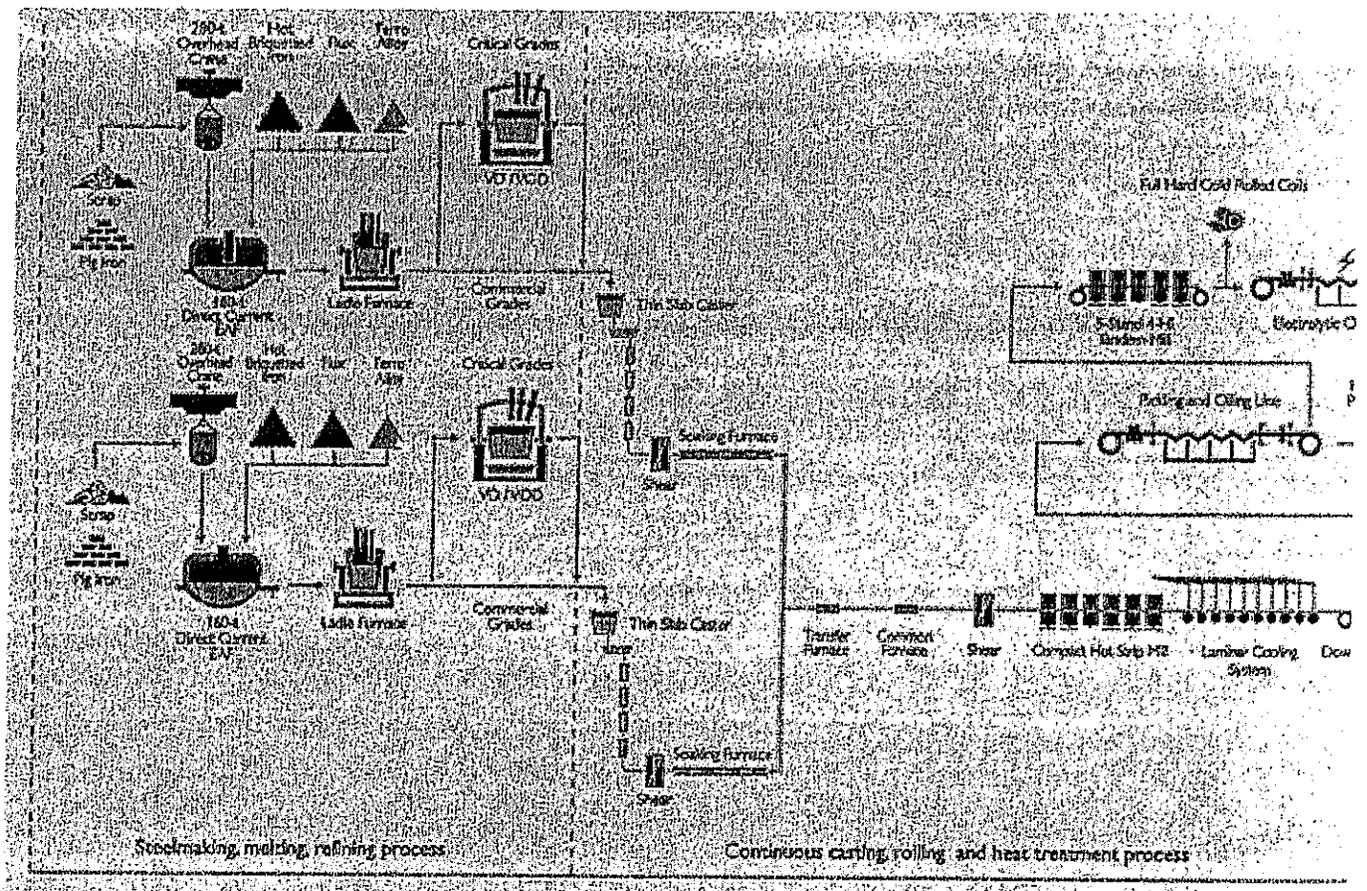
Testing to conform to standard requirements comprising tensile, bend, hardness, and impact tests

Online Inspection

Conducted on all products, assuring zero surface / internal defect

Macro Examination ⑤:

Macro specimens are analysed to conform to application properties



Production Facilities

1. HBI (Hot Briquetted Iron), DRI (Direct Reduced Iron), pig iron and selected scrap are the raw materials for making quality steel.
2. 2X Electric Arc Furnaces are of the most modern design in the world
3. Ladle Furnace to ensure steel chemistry and quality superiority.
4. Thin Slab Continuous Caster in operation.

5. Soaking Furnace to ensure even slab temperature before rolling.		6. 6-stand Hot Strip Mill with 4-high CVC (Continuous Variable Crown) design to guarantee profile and gauge accuracy.	
--	--	---	--

7. Laminar Cooling System ensures even strip temperature and mechanical properties of coils.
8. High-speed Downcoiler for coiling of strip into HRC.

Business Address:
Lot 1 Jalan Waja,
Bukit Raja Industrial Estate,
41050 Klang, Selangor

Telephone Number:
603-3343 4900 / 3343 4895-97

Telefax Number:
603-3341 2191

Website:
www.lion.com.my

Email:
Changcs@lion.com.my

Business Enquiries:
Mr. Eric Cheng – Chief Executive Officer
Mr. Vijay Kumar – Head of Purchasing
Mr. Lee Ching Kion – Head of Marketing

Established:
1999

Number of Employees:
795

Ownership:
27.11% Bumiputera, 67.62% Malaysian, 5.27% Foreign

Annual Capacity:
2,000,000MT

Annual Sales:
RM883 Million

Products Manufactured:
HRC & CRC

Materials:
Scrap, Hot Briquetted Iron, Pig Iron

Main Production Process:
Integrated Hot Rolled Coil Production, Steel Making, Steel Refining, Thin Slab Casting,
Hot Rolled Coil Rolling

Secondary Prod. Process:
Skin Passing

Manufacturing Facilities:
EAF, LF, VOD, CSP Thin Slab Casting, Soaking Furnace, CSP Rolling Mill, Strapping
Machine, Skin Pass Mill

Testing Equipment:
Optical Emission Spectrometer, XRF, Gas Analyser, Universal Tensile Machine,
Hardness Tester, Bend Tester, Impact Tester

Accreditation to Quality Management System:
Certified by SIRIM, Standard ISO9001

