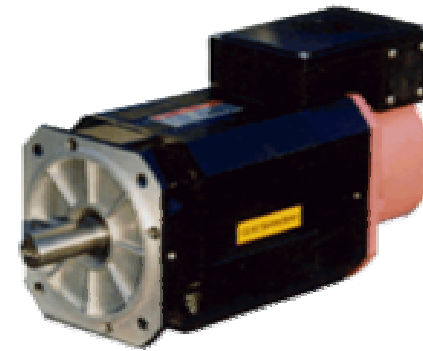


# POSCO Projects Reference



**HIGEN Motor Co., Ltd.**

## One of the Most Efficient and Largest Steel Mills in the World

A



**Pohang Steel Plant**

B



**Kwangyang Steel Plant**

[www.posco.com](http://www.posco.com)

Established year : April 01, 1968 Pohang Iron and Steel Co., Ltd

Annual Sales : USD24 Billion (2008)

Net Profits : USD3.5 Billion (2008)

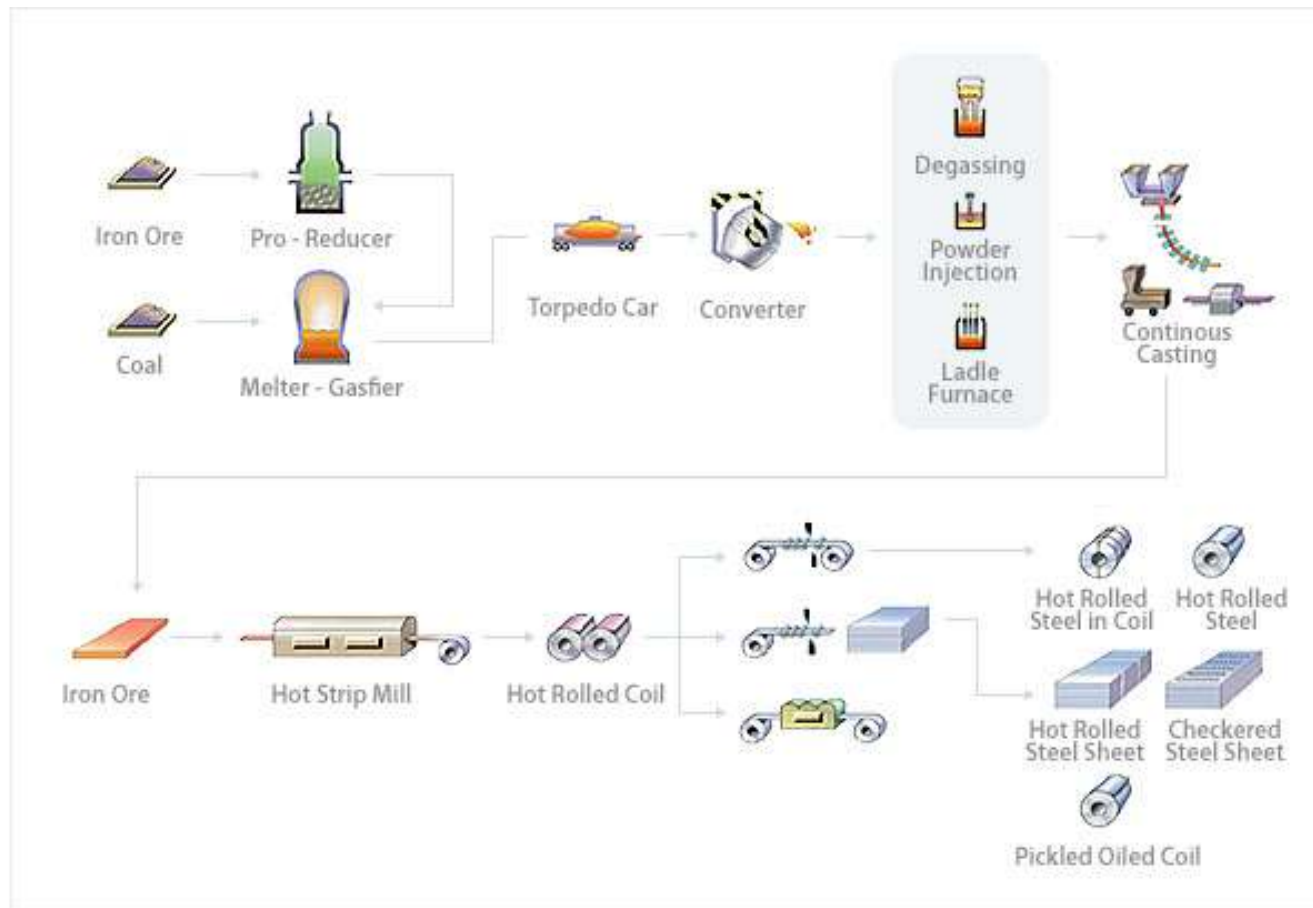
Number of Employees : 12,619 in Korea

Production Capacity : 31,837,000 MT (Finished Products)

Products : Hot Rolled Steel, Steel Plate, Wire Rod, Cold Rolled Steel, Electrical Steel, Stainless Steel

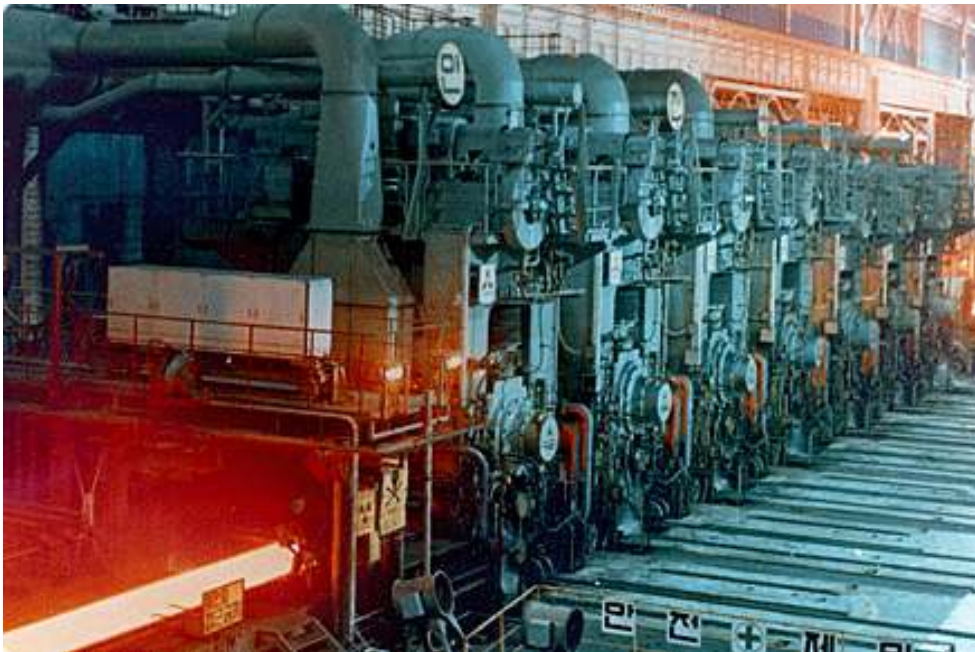
Listed on NY Stock Exchange and London Stock Exchange.

## Mini-Mill Process Flow



<http://www.posco.com/homepage/docs/eng/html/company/product/s91e3010010c.html>

## Hot Strip Mill, Pohang



## Continuous Casting Plant, Kwangyang

## ✓ State of Art Motor Solution for High Torque and Energy Efficient Operation



**11KW 8P VECTOR INVERTER MOTOR  
(KWANGYANG MILL)**



**11KW 6P VECTOR INVERTER (POHANG MILL)**

## ✓ State of Art Motor Solution for High Torque and Energy Efficient Operation



75KW 8P VECTOR INVERT MOTOR

✓ **State of Art Motor Solution for High Torque and Energy Efficient Operation**



**260KW 6P VECTOR INVERTER MOTOR (4 units)**

## 1. Case (1)

- **Problem** : Shock and vibration damage on Motor leg and cost increase due to disruption and repair on production line.
- **Solution** : Improvement of material substance for motor frame and increased surface coverage of mounting area. Currently approximately 500 units of HIGEN Motors are installed in roller tables at Continuous Casting Mills at Pohang and Kwangyang.



| Strength Review (LEG part)   |               |        |
|--|---------------|--------|
| DATA   | 15 KW         |        |
|  | GCD150        | GCD450 |
| Permissible Tensile Strength(min) ( $\sigma_B$ , kgf/mm <sup>2</sup> ) | 13            | 46     |
| Permissible Shear Strength ( $\tau_a$ , kgf/mm <sup>2</sup> )          | 0.5           | 1.77   |
| LEG part Working Force ( $F_s$ , kgf)                                  | 294           |        |
| Working Section Area (A, mm <sup>2</sup> )                             | 276           | 870    |
| Working Shear Strength ( $\tau$ , kgf/mm <sup>2</sup> )                | 1.07          | 0.34   |
| Safety Factor ( $S_w$ )  | 0.47          | 5.23   |
| Minimum Safety Factor (Criteria on the Basis of Shock Load)            | more than 1.1 |        |
| Ratio of Permissible Shear Strength to Working Shear Strength          | 213.4%        | 19.1%  |
| Improvement Ratio of Safety Factor by Changing of Material to GCD450   | 1115%         |        |

## 1. Case (2)

Cost effective Import Substitution in 2003

- HIGEN MOTOR replaced AC Vector 45kW 4P KLOSE motor with 14 units of HIGEN MOTOR for V5 type installation at TURN DISH CAR saving the investment cost.



Site delivery before installation.

## 1. Case (3)

### • Problem

Scarfig process had disruption at Casting Line III, Continuous Casting Mill No. 2 at Kwangyang Plant in 2003.

### • Solution

Higen Motor replaced DC 37kW motor with AC Vector 55kW 6P motor and successfully solved motor burn-out and line troubles.

## 1. Case (4)

**계약 변경 합의서**  
(제 2 호)

주식회사포스코건설 대표이사 한수영 (이하 "갑" 여리함) 과 엘지기전(주) 대표이사 김영미(이하 "을" 이리함) 간에 체결한 계약건에 대하여 아래와 같이 계약을 변경함.

1. 계약번호 : 2004-0-0-0043

2. 계약간명 : 공장 타라 원료처리장에 신설 Motor

3. 계약금액 :

4. 계약변경내용 단위(USD)

| 구분   | 당초                        | 변경                        | 비고 |
|------|---------------------------|---------------------------|----|
| 계약기간 | 2004년03월11일 ~ 2004년04월29일 | 2004년03월11일 ~ 2004년04월31일 |    |
| 계약납기 | 2004년04월19일               | 2004년04월31일               |    |

5. 기타사항은 당초 계약과 동일함.

2005년01월04일

●(갑) 주 소 : 경북 포항시 남구 괴동동 689-1번지  
상 호 : 주식회사포스코건설  
대표이사 : 한수영 (인)

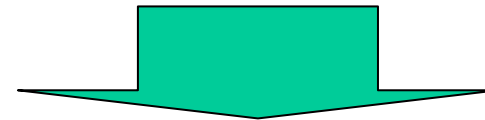
●(을) 주 소 : 경북 포항시 남구 대림동221-4번지  
상 호 : 엘지기전(주)  
대표이사 : 김영미 (인)

●(을)의 연대보증인  
주 소 : 서울 강남구 테헤란동944-1 엘라스타워  
상 호 : 오비스엘지엘라타워(유)  
대표이사 : 장명우 (인)

본 계약서는 (주)포스코건설과 상호일치하여 공인장본을 가지며, 체결한 전자계약서입니다.  
본 계약에 관한 공지는 (주)포스코건설 담당부서에 공시합니다.

### Motor Requisition Spec.

- 55kW ~ 560kW 6P
- SPEC : K2(Double Squirrel Cage), 6600V, 100%ED S.F 1.2 Start Torque 150% or above.



### HIGEN Motor Solution

Result : 1. Start up test completed successfully and main operation proceeded upgrading **Start Torque 180% or above** in excess of the standard set by customer

2. In recognition of this technical achievement the customer recommended HIGEN Motor for similar projects.

## 1. Case (5)

### High Voltage Motor for Belt Conveyor Line (Kwangyang CTS Raw Material Handling Facility, FINEX)

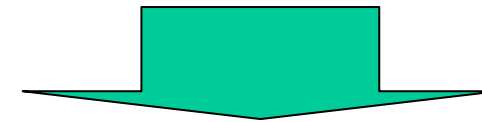


## 1. Case (6)

| 구 매 계약서  |  |  |  |
|--|--|--|--|
| 1. 계약번호 : 2005-B-P-0340  |  | 3. 계약의 목적물 :   |  |
| 2. 시내거래단위코드 : A40176EA   |  | 포항 FINEX 원료처리설비 30 MOTOR   |  |
| 총액 :<br>4. 계약 금액 : 오역 칠천칠백삼십구만<br>공급기간 : MONTH<br>부가세액 : MONTH                             |  |  |  |
| 5. 계약기간 : 2005년06월01일 ~ 2006년01월05일  |  | 6. 계약보증금 : MONTH   |  |
| 7. 계약보증기간 : 2005년06월01일 ~ 2006년01월05일  |  | 8. 하자보증금 : 가. MONTH  |  |
| 9. 하자보증기간 : 최종납품일 ~ 2006년06월30일  |  | 나.   |  |
| 10. 지체상금률 : 1.50/1000 (V.A.T 포함)   |  | 11. 인도조건 : "계약내역서"에 별도명기   |  |
| 12. 납품 장소 : "갑" 의 지정장소   |  | 13. 검수장소 : "갑" 의 지정장소  |  |
| 14. 대금의 지급 : 특별한 별도 명기   |  |  |  |
| 상기사항과 부속서류를 내용으로 "갑" 과 "을" 간 계약서 2부를 작성, 날인하여 본 계약을 체결하고 각각 1부씩 보관한다.<br>2005년06월01일       |  |  |  |
| "갑"<br>주 소 : 경북 포항시 남구 괴동동 568-1 번지<br>상 호 : 주식회사포스코건설<br>성 명 : 대표 현 수 영                   |  | "을"<br>주 소 : 경북 포항시 남구 대강동221-4번지<br>상 호 : 엘지기전(주)<br>성 명 : 대표 김영미 |  |
| "을"의 연대표명인<br>주 소 : 서울 강남구 대치동946-1 글라스타워<br>상 호 : 오티스엘지엘리베이터(유)<br>성 명 : 장 병우             |  | 주식회사포스코건설  |  |
| 본 계약서는 (주)포스코건설과 상이업체간에 공인인증을 통하여 체결한 전자계약서입니다.<br>본 계약에 대한 문의는 (주)포스코건설 합일부서에 문의하시기 바랍니다. |  |  |  |

### Motor Requisition Spec.

- 15KW~ 400KW 6P
- SPEC : K2(Double Squirrel Cage), 6600V, SF1.2  
Start Torque above 150%. Temperature Sensor



### HIGEN Motor Start-Up Test Result

- Result : 1. Start up test completed successfully and main operation proceeded upgrading **Start Torque 180% or above** in excess of the standard set by customer
2. In recognition of this technical achievement for the FINEX process, the customer recommended HIGEN Motor for similar projects.

## 1. Background

- Under POSCO's management innovation plan, HIGEN Motor was selected as one of benchmark tour destinations among the several thousand vendors.

## 2. Benchmark tours

- Visitors : Managers of each business division, Manger of Innovation Team (Q Master), Line workers
- Tour Records
  - 1) First tour started from Electrical Steel Sheet Division as a part of innovation program
    - May ~ Aug, 2007., 280 people mainly from Electrical Steel Sheet plant visited HIGEN Motor over 7 times in total
  - 2) Expanded benchmark tour programs :

The benchmark tours were expanded to other relevant divisions such as Electrical / Mechanical maintenance forces, R&D, Environmental, Energy division as follows :

    - Sep ~ Dec, 2007., 320 visitors in aggregate, total 8 times on a bi-weekly basis
  - 3) Jan, 2008, 25 people of R&D in POSCO

## 3. POSCO Visitors Comments

HIGEN Motor tour gave strong motivation for innovative and practical approach to bring technical improvement on the production work spots.

# HIGEN MOTORS

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