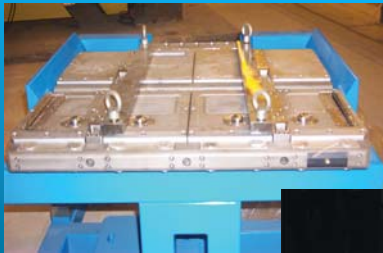
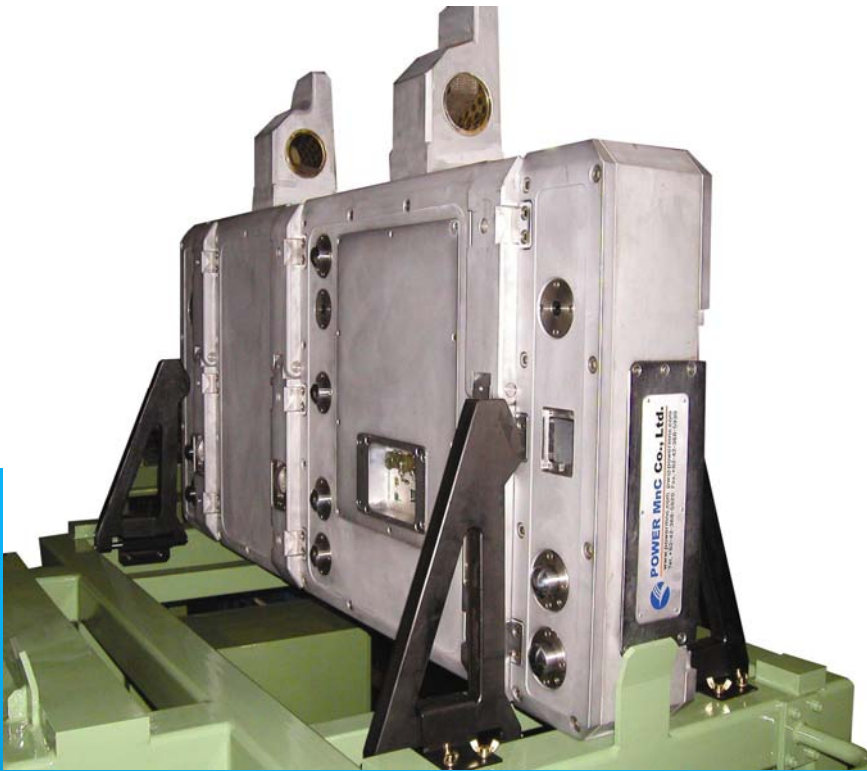
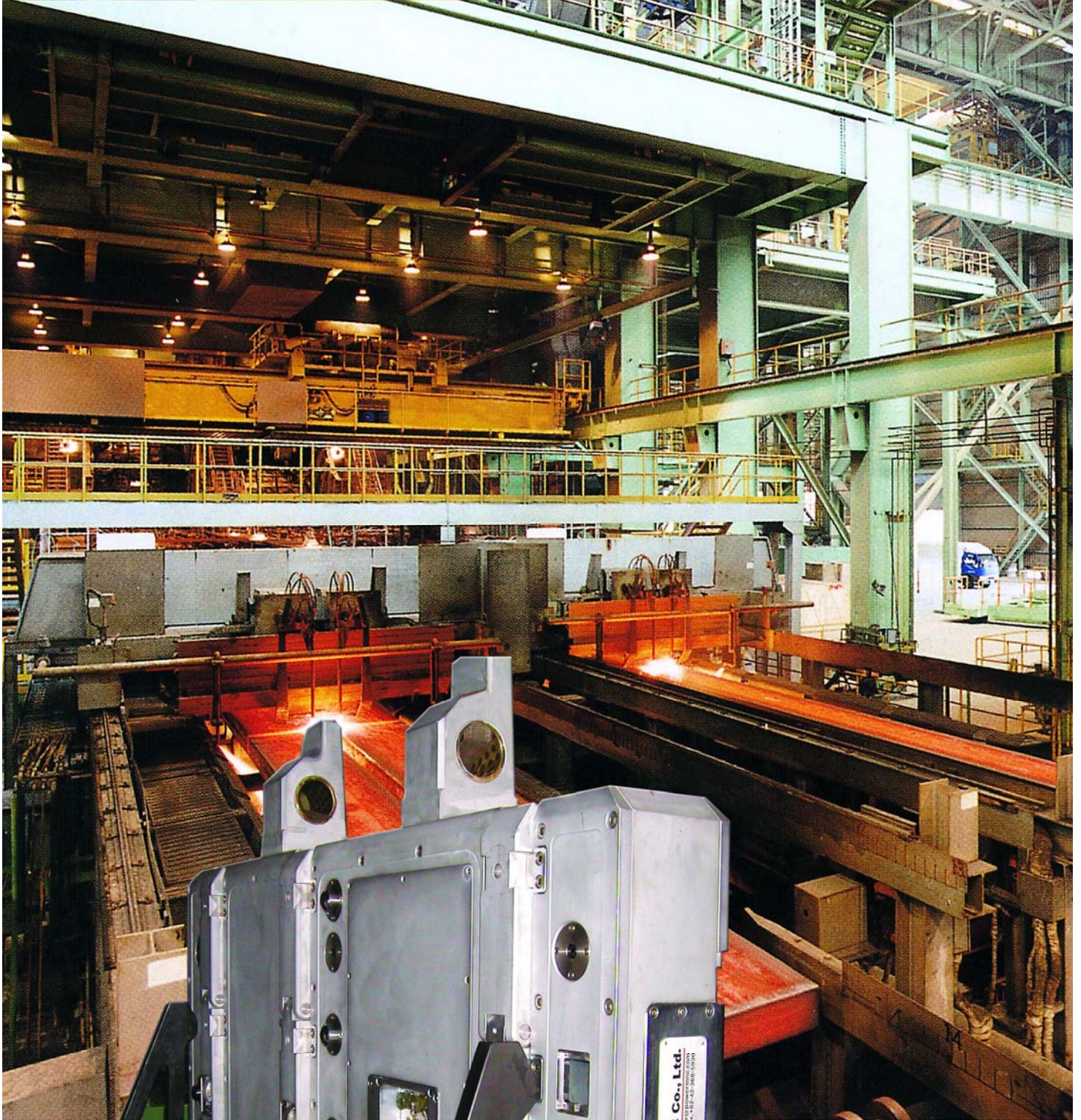


Caster Strand Monitoring System Roll Checker



Caster Strand Monitoring System



POWER CSMS for

Best product quality

Highest producing rate

Longest facility life

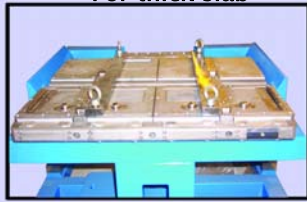


Caster Strand Monitoring System

For best product quality at highest production rate



For thick slab



For medium/thin slab



For bloom



In-chain type

High quality products of continuous casting can be defined as (1)Uniformity in Thickness and Microstructure (2)Defect free against Surface Crack, Center Line Segregation and Internal Cavity.

For best quality casting and smooth operation of the machine, it is essential to keep pass line geometry and operation conditions as designed, which becomes more and more important for the newly introduced caster equipped with innovative technologies, like as soft reduction or liquid core reduction.

POWER CSMS (Roll Checker) has proven to be very faithful to watch and keep the pass line geometries and operation conditions, the application of which through wide range of products have contributed for best quality and highest production rate at world leaders in iron and steel making industries.

The measured information for roll gap, roll bending/wearing, roll alignment, roll rotation, roll temperature and water spray conditions are collected and stored on board computer and transferred to host PC by wire and wireless communication.

POWER CSMS is just at the leading edge of CCM monitoring technology which can fulfill real time feedback control of the caster for pass line geometry and spray cooling operation through on-casting measurement by in-chain type monitor equipped with fully automated measuring, analysis and communication system.

CSMS Supported Measuring & Control

Pass Line Geometry

- Roll Gap
- Roll Alignment
- Roll Bending/wear
- Roll Rotation

Cooling condition

- Water Spray
- Roll Temperature

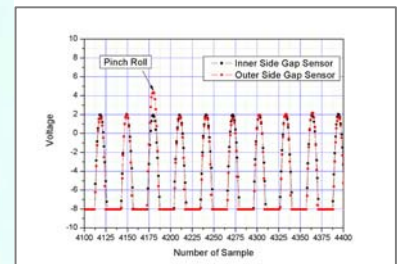
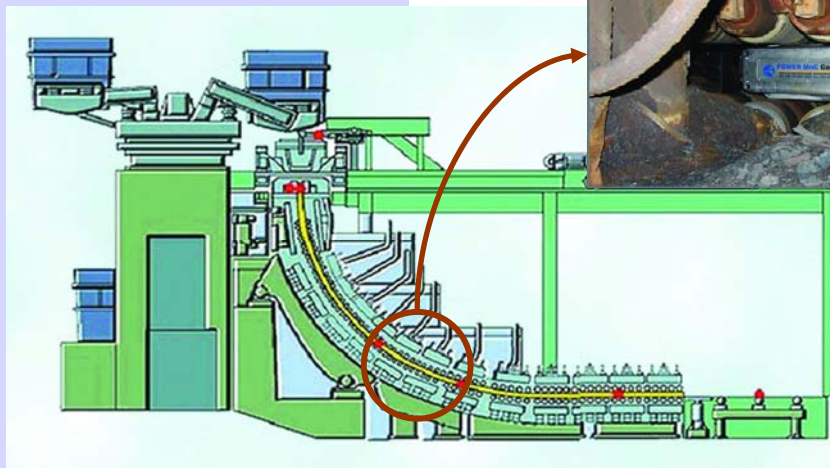
Improved Casting Quality & Productivity

Quality

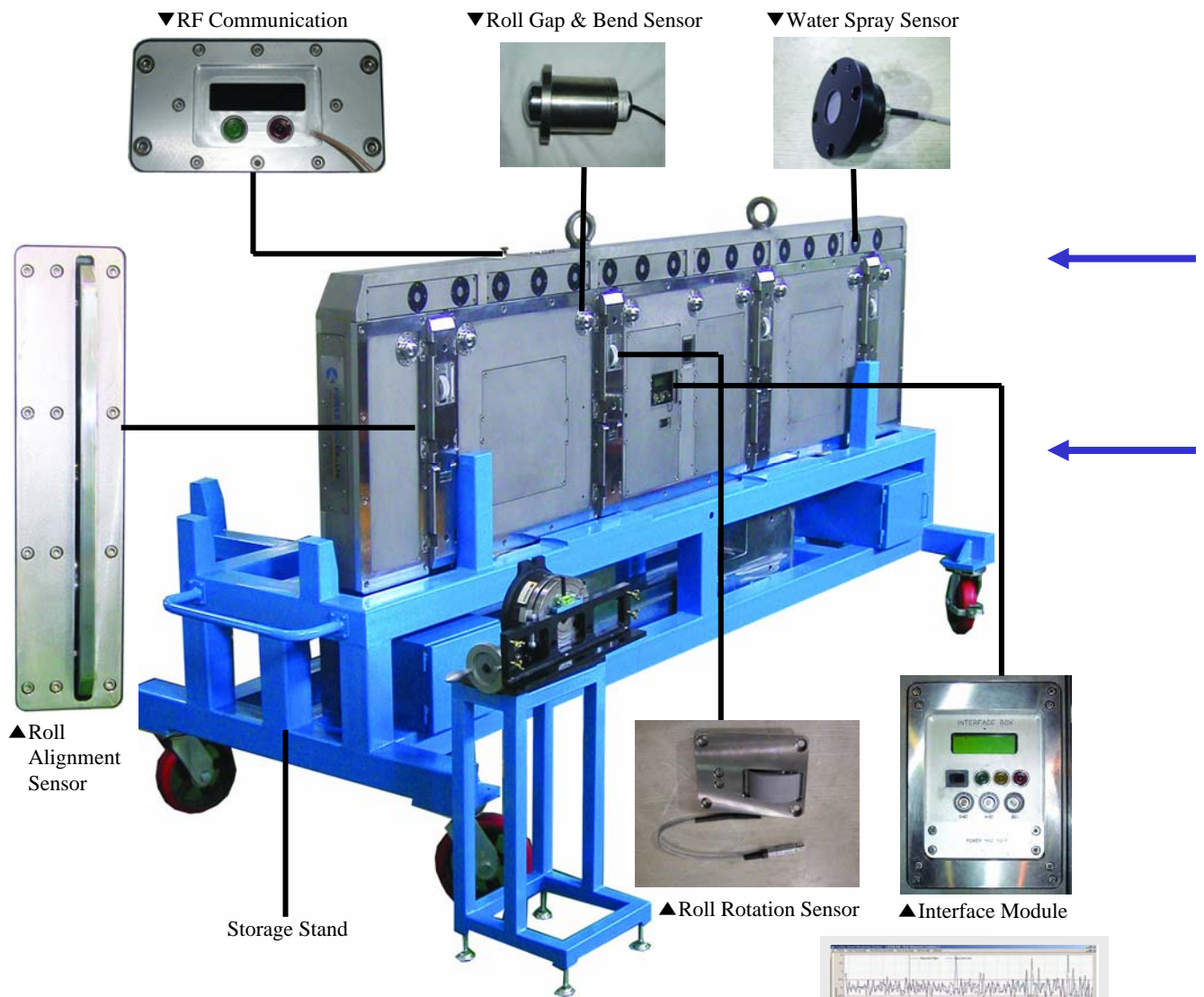
- Uniform Thickness
- Microstructure
- Center Line Segregation
- Internal Cavity
- Surface Crack

Productivity

- Reduce Break-out
- Maintenance Scheduling

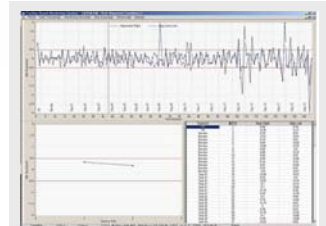


Caster Strand Monitoring System

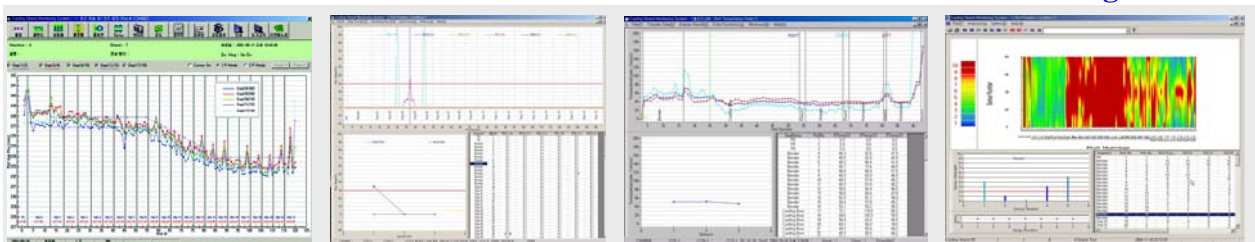


MEASURED RESULTS DISPLAY

- * MS Windows based software with graphical user Interface report.
- * Measured results can be reported to MS Excel format file.



Roll Alignment



Roll Gap

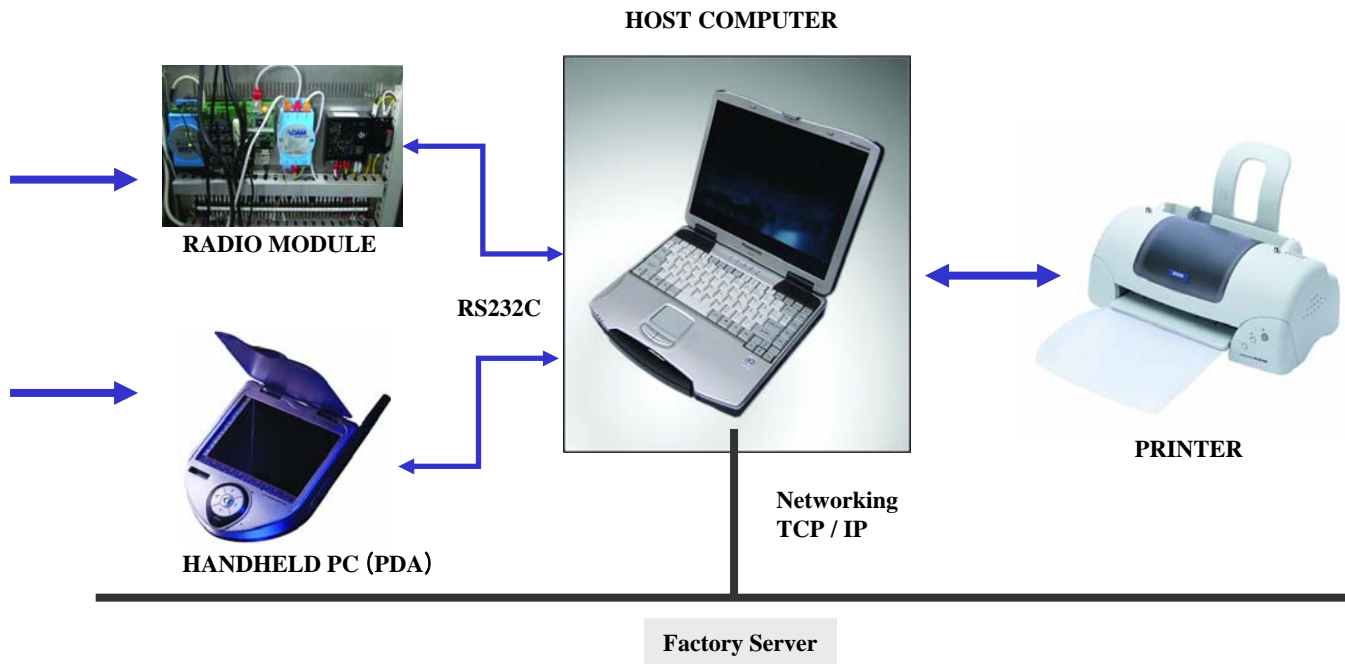
Roll Rotation

Roll Temperature

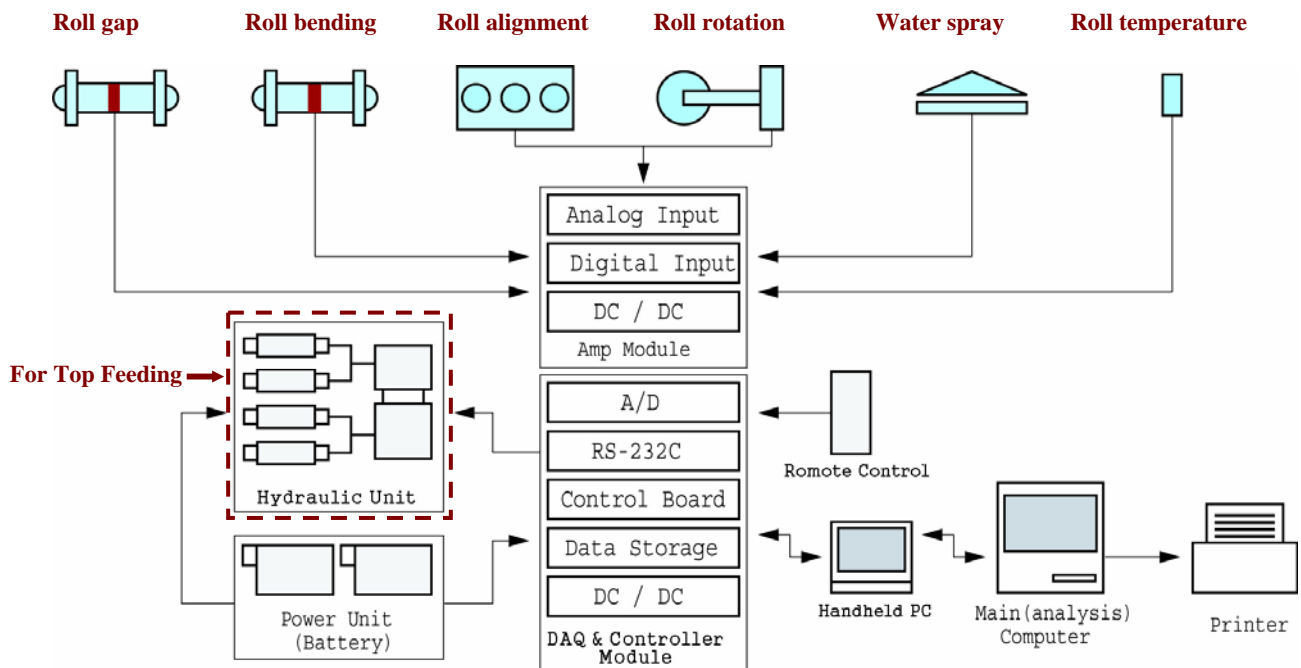
Water Spray



Caster Strand Monitoring System

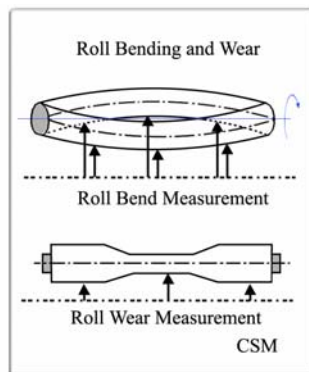
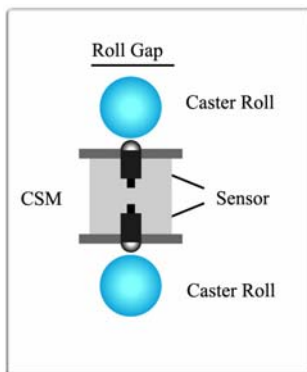


SYSTEM SCHEMATICS OF CSMS



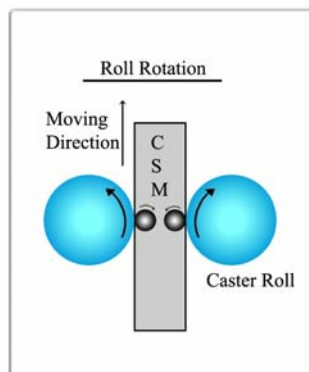
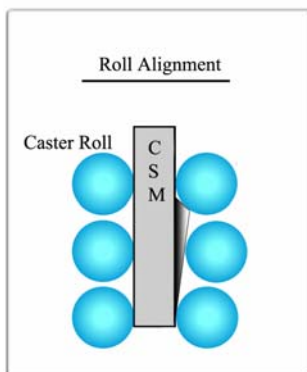
Caster Strand Monitoring System

PRINCIPLE OF MEASUREMENT



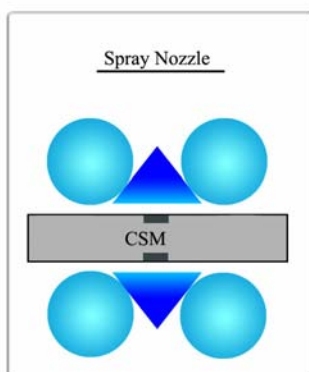
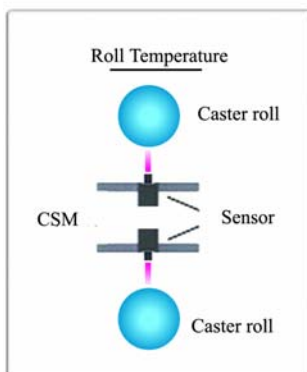
MEASURE OF ROLL GAP can be made by collecting the signal from a pair of gap sensor installed at both sides of monitor frame which serves as the reference plane of measuring sensor with calibrated thickness. By using sampling rate considered gap sensor design and high speed data processing scheme, measuring accuracy is ensured regardless of variable dummy bar traveling speed.

MEASURE OF ROLL BENDING/WEARING can be done in two ways; (1) by measuring the distance to outer roll surface at different locations across the width direction (2) by measuring roll gap at multiple points through circumference of circular roll and comparing the deviation between the measured values.



MEASURE OF ROLL ALIGNMENT is made only for fixed side roll arrangement showing the magnitude of roll misplacement. By double checking of misaligned angle of the target roll against fore and rear side placed rolls, the shortcomings of sequential measurement of relative angle can be recovered.

MEASURE OF ROLL ROTATION is determined as the slip ratio of wheel of rotation sensor which contact with the surface of the caster roll. If the roll bearing condition is so good as to rotate freely by dragging force of the anvil friction, there happens no slip between sensing wheel and roll as to generate no signal to rotation sensor.



MEASURE OF ROLL TEMPERATURE is made by non-contact type fast response ultrasonic sensor. Since the roll temperature is determined by the combined cooling efficiency of water spray, roll and bearing cooling circuit, it can give very useful information for optimized scheduling of maintenance and repair.

MEASURE OF SPRAY NOZZLE CONDITIONS is made by highly sensitive pressure sensor. Arrayed spray sensors across the slab width check spray cooling intensity which is linearly dependent on impact pressure at monitor surface. For clogging condition check of every spray nozzle, the sensor arrangements are designed to be at least 1 to 1 match against overall spray nozzle locations.



Caster Strand Monitoring System

Design Philosophy and Operation Features

MONITOR FRAME provides protective containing room for sensors, electronics and cable harness as well as a platform for sensor installation. The structure design should be strong enough to rigidly withstand against all the external forces during measuring and handling.

Since the external plane of monitor frame should be used as a geometrical reference of measurement, its dimension interference and moving posture in the caster need to be checked through operating simulation.

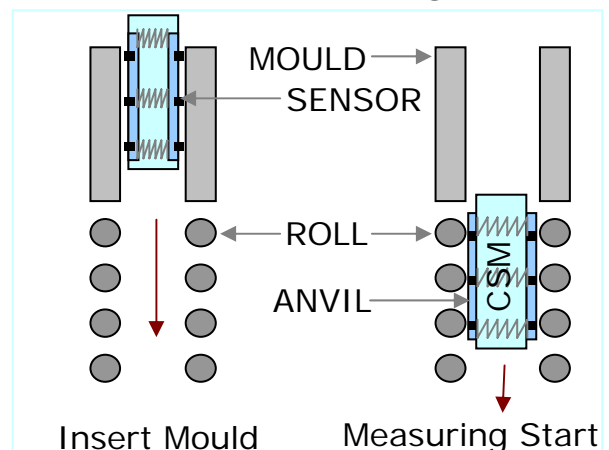
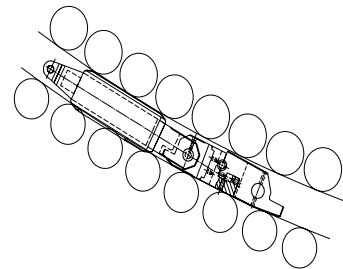
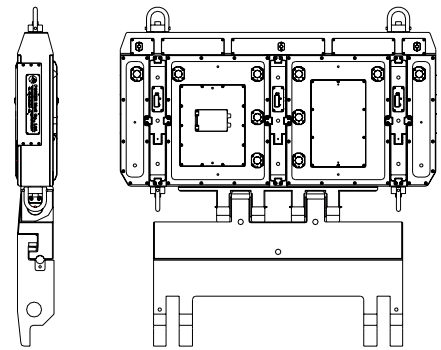
ANVILS WITH HEAVY DUTY SPRINGS are installed in the frame to guarantee stable positioning of the monitor against rolls of caster during measurement. The spring force is strong enough to lift up the heaviest roll which can eliminate the bearing clearance; it makes a simulating condition of ferro-static pressure by the molten steel inside of the solidified shell of slab.

FOR TOP FEEDING TYPE CASTER, the anvil should be retracted into the monitor by built-in hydraulic system during mold insert, and be released to push out the roll after passing mold.

Since all functional equipments are compactly designed into the monitor body including hydraulics and battery, no external supply of hydraulic and electric lines are needed for operation. Thus, time required for mold insert and checking circulation can be minimized.

SOFTWARE

- Graphical User Interface for user convenience.
- Graph and Worksheet Display for Caster Conditions
- Export Data for compatibility with Microsoft Excel
- Enables trend analysis of historical measurements
- User adjustable target and maintenance tolerance values
- Enables customized checking report generation
- report with alarm for required maintenance



Multifunctional almighty PDA can back-up following jobs

• As Data Transfer Between Measuring Monitor and Host PC

Downloading of measured data from the data logger in measuring monitor can be done by Wire and/or Wireless communication. It can save labor and risk of handling Host PC (Notebook) at dusty and dangerous site which can not be avoided without PDA

• As Remote Controller

Since PDA has the function of control and monitoring of CSMS operation through wireless communication, it can be used as a provision against the remote controller.

• Sensor Calibration

Site calibration of each sensor can be performed easily, simply by following well-programmed routine with graphically displaying instructions. The setting values of each sensor through calibration are stored in PDA and downloaded to Host PC for data analysis.

• System Testing

The operational integrity can be checked electric/electronics as;

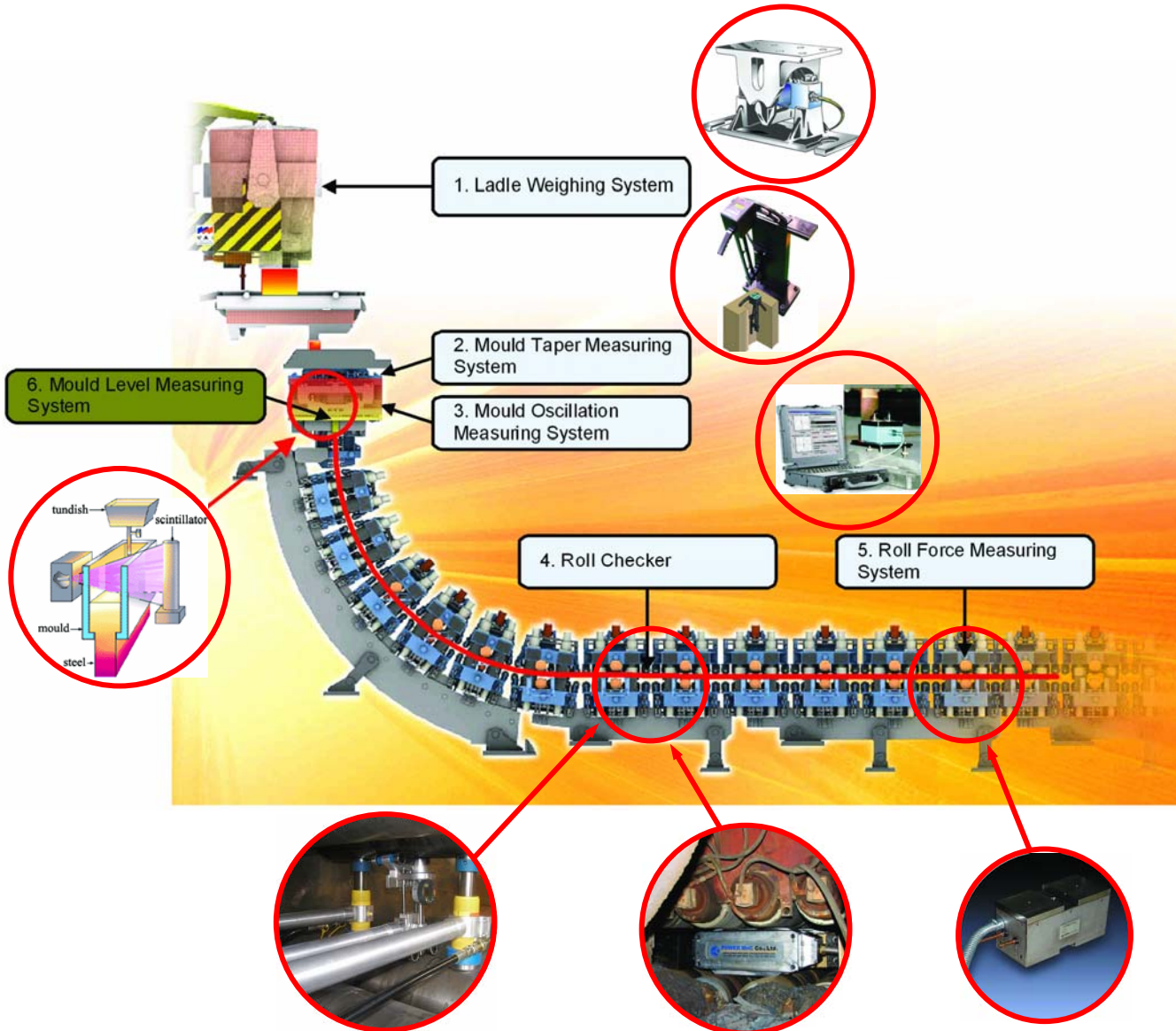
- reliability of each sensor
- operation of communication module
- charging status of built-in battery system



Caster Strand Monitoring System

POWER Equipments

for Measuring & Control of Continuous Casting Plant



Address: 461-36 Jeonmin-dong, Yuseong-gu, Daejeon, 305-811 Korea

Tel. +82-42-3685920 Fax. + 82-42-3685930 e-mail: pw@powermnc.com web-page: www.powermnc.com



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