JFE Global Strategy for Automotive Market

18th of November, 2015

JFE Steel Corporation
**Outline of JFE Group**

JFE Group was established by merger of Kawasaki Steel and NKK in 2002. JFE Steel is a wholly-owned subsidiary of JFE Holdings, Inc.

**World’s 10th largest in crude steel production**

World crude steel production ranking in 2013 (Consolidated) (Source: WSA)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Rank</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arcelor Mittal</td>
<td>6</td>
<td>POSCO</td>
</tr>
<tr>
<td>2</td>
<td>Nippon Steel &amp; Sumitomo Metal</td>
<td>7</td>
<td>Shagang (China)</td>
</tr>
<tr>
<td>3</td>
<td>Hebei (China)</td>
<td>8</td>
<td>Ansteel (China)</td>
</tr>
<tr>
<td>4</td>
<td>Bao (China)</td>
<td>9</td>
<td>Shougang (China)</td>
</tr>
<tr>
<td>5</td>
<td>Wuhan (China)</td>
<td>10</td>
<td>JFE</td>
</tr>
</tbody>
</table>
Production sites were combined into 2 large Integrated Steel Works + 1 Steel pipe Work for improved effectiveness and efficiency
Steel is the right material for Auto

Other Steel Advantages

- Stable Supply with large volume
- Global Suppliability
- High Recycle ratio
- Excellent Formability
- AHSS (Transformation Strengthening)
- Weldability
- Repairability
- Class A Surface Quality (After Paint)

Note) ABCDE: Non metallic light weight materials

JFE’s Strategy

Concentration on Steel rather than Non metallic light weight materials
Steel Advantage: Basic Characteristics
- Broad Range of TS Line up -

Mechanism of Strengthening based upon “Metallurgy”

- Solid Solution C,Mn,P
- Precipitation Ti,Nb
- Transformation Ferrite, Martensite, Bainite, Pearlite, Retained Austenite, etc.

Source: WAS AHSS guidelines V 5.0
Our Automotive Customers

Supply to all Japanese OEMs

- VW
- PEUGEOT
- CITROEN
- FIAT

Expand to Non-Japanese OEMs

Asian

- TOYOTA
- NISSAN
- HONDA
- MITSUBISHI
- SUBARU
- SUZUKI
- MAZDA
- ISUZU
- DAIHATSU
- HYUNDAI
- KIA

American

- GM
- FORD
Product Strategy for Auto

Virgin Metal from BF and Converter

Combination of Advanced Technology & Patent

Long-term Business Relationship

BF
Converter
CC
Rolling & Finishing
Product Line up for Auto

Provide all Steel Products for Automotive Applications

Sheet & Strip Products
- Hot Rolled Products
- Cold Rolled Products
- Coated Products

Carbon Steel

Stainless
Pipe
Bar
Silicon Steel
Iron Powder

By providing all kinds of steel products
- Provide sophisticated products for our customer
- Acquire stable position as a supplier
Full Product Line-up for Auto Applications

- Suitable material for each part’s requirements -

<table>
<thead>
<tr>
<th>Component</th>
<th>TS (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIW/Closure/Bumper</td>
<td>440-980 MPa</td>
</tr>
<tr>
<td>Side Outer</td>
<td>270-440 (EDDQ)</td>
</tr>
<tr>
<td>Exposed</td>
<td>270-440 (BH)</td>
</tr>
<tr>
<td>Energy Absorption</td>
<td>590-980</td>
</tr>
<tr>
<td>Cabin</td>
<td>780-1180 (PHS)</td>
</tr>
<tr>
<td>Reinf.</td>
<td>980-1470 (PHS)</td>
</tr>
</tbody>
</table>

Hood Outer:
(Excellent Surface Quality, Anti-Dent & Chipping/Rigidity)

Hood Inner (Formability)

Chassie

440-980 MPa
(Hole Expansion/Fatigue/Anti-corrosion)

Door Outer
(Excellent Surface Quality, Anti-Dent & Distortion/Rigidity)

Fender (Deep Drawability)

Cabin (Anti-Crush)

High Energy Absorption

Trunk Lid (Formability/Anti-Dent)

Side Panel Outer (Formability/Anti-Dent)

Reinf. (Anti-Crush)
Total Solution for Automotive Customers

【Vehicle design & manufacturing process】

Design → Trial Production → Commercial Production → Driving on the Road

Designing → Material Engineering → Production Engineering

JFE’s Early Vendor Involvement activities - Co-Work with OEMs -

【Products】

- BH
- IF
- Residual γ-Steel
- Low C Solution Hardened
- BH-T
- Precipitation Hardened
- Bainite
- Dual Phase

【Support for Design】

- High Speed Crash Test
- High Speed Tensile Test
- Crash Simulation
- Stamping Test
- Stamping Simulation

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Global Supply Bases for Automotive Customers

JFE’s Global Strategy

(1) Asia/Oceania: Production on site
(2) EU/USA: Technical Alliance

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<table>
<thead>
<tr>
<th>Place</th>
<th>Nan sha district, Guangzhou</th>
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</thead>
<tbody>
<tr>
<td>SOP</td>
<td>April, 2006 (No.1 CGL)</td>
</tr>
<tr>
<td>Facilities &amp; Capacity</td>
<td>(1) PL-TCM : 1.8 mill. MT/y., 2011</td>
</tr>
<tr>
<td></td>
<td>(2) CAL : 1.0 mill. MT/y., 2011</td>
</tr>
<tr>
<td></td>
<td>(3) No.1 CGL : 400 k MT/y., 2006</td>
</tr>
<tr>
<td></td>
<td>No.2 CGL : 400 k MT/y., 2012</td>
</tr>
<tr>
<td>Products</td>
<td>CR・GA・GI steel sheet for automotive</td>
</tr>
<tr>
<td>Share holders</td>
<td>JFE Steel Corp. 50%, Guangzhou Steel Sheets Co., Ltd. 50%</td>
</tr>
</tbody>
</table>
Facility Overview

**Total Capacity**
1.8 Million Mt/ year

**Phase I**
- Mar. 2006
- #1 CGL (400 k Mt/ y)
- Galvanized Steel Sheet
  - 800 k Mt/ year

**Phase II**
- Jul. 2011
- PL-TCM (1.8 mill. Mt/ y)
- #2 CGL (400 k Mt/ y)
- CAL (1 mill. Mt/ y)
- Cold Rolled Steel Sheet
  - 1 mil. Mt/ year

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**PL-TCM (Pickling Tandem Cold Mill)**

**Capacity:** 1,800,000 t/Y  
**Thickness:** 0.3-2.6mm  
**Width:** 800-1850mm  
**Type of Mill:** 4 Stands, all 6 Hi
No.1 CGL (Continuous Galvanizing Line)

Main Spec.

- Capacity: 400 k MT/Y
- Thickness: 0.5-2.3mm
- Width: 800-1700mm
- Products: GA&GI, HR-GA&GI,
- Major Product mix
  - GA & GI for Automotive Outer Panel
  - Highly lubricated GA
  - Hot Rolled GA&GI
  - High tensile steel GA&GI
No.2 CGL (Continuous Galvanizing Line)

Main Spec.

- Capacity: 400 k MT/Y
- Thickness: 0.4-2.6mm
- Width: 800-1850mm
- Products: GA&GI, HR-GA&GI,
- Major Product mix
  - GA for Automotive Outer Panel
  - Hot Rolled GA&GI
  - High Tensile Steel GA&GI
Highly Lubricated GA

- Avoid Stick with Thin Oxide Layer on Fe-Zn Surface

- Widely received by OEMs in the globe

- Environment – Friendly
  (No metallic elements contained)
**CAL (Continuous Annealing Line)**

**Main Spec.**

- **Capacity:** 1 Million MT/Y
- **Thickness:** 0.3-2.6mm
- **Width:** 800-1850mm
- **Features:**
  - Wide range of Size Availability
  - Major Product mix
    - *Automotive Outer Panel*
    - *Deep drawing*
    - *High Tensile Steel*

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The supplier awards

2013 Nissan

2012 Honda

2014 Honda

2013-2014 GAC MOTOR
Rapid Sales Growth for Auto
JSGT
- JFE Steel Galvanizing (Thailand) Ltd. -

Thailand’s 1st CGL for Auto

Location: Hemaraj Eastern Seaboard Industrial Estate

- Good access to customers
- Stable utility supply

<table>
<thead>
<tr>
<th>Place</th>
<th>Rayong Province</th>
</tr>
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<tr>
<td>SOP</td>
<td>April, 2013</td>
</tr>
<tr>
<td>Facility</td>
<td>CGL: 400 kMT/Y &amp; RCL</td>
</tr>
<tr>
<td>Products</td>
<td>GA steel sheet for auto - Outer &amp; Inner panel - High Tensile Steel</td>
</tr>
<tr>
<td>Size Availability</td>
<td>Thickness: 0.4-2.3mm Width: 800-1880mm</td>
</tr>
<tr>
<td>Capital</td>
<td>JFE Steel Corp. 100%</td>
</tr>
</tbody>
</table>

Good access to customers
Stable utility supply

- Toyota
- Nissan
- Honda
- Mitsubishi
- Isuzu
- Suzuki
- AAT
- Ford
- GM
JSGI
- PT.JFE STEEL GALVANIZING INDONESIA -

Indonesia’s 1st CGL for Auto

Place: Kota Bekasi
SOP: March, 2016 (planned)
Facility: CGL: 400 kMt/y
Products: GA steel sheet for auto
- Outer & Inner panel
- High Tensile steel
Size Availability: Thickness: 0.4-2.3mm
Width: 800-1850mm
Capital: JFE Steel Corp. 100%

Vehicle Production

Source: Marklines

Market Growth

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To expand strategic collaboration with JSW India’s Major Steel Maker

JFE is providing Technical Assistance for the operation

JFE Announced on Aug. 2012 Licensing technology to JSW in Auto Steel

- CRM: 2.3 mill. MT/y
- CAL: 950 k MT/y x 2
- CGL: 400 k MT/y

Vehicle Production X 10 thousand

Market Growth

Source: Marklines
Technical Alliance in Auto

Long-term Technical Alliance
- More than 10 years -

Germany

USA

★ Global Supply of High-End products
★ Joint R & D
★ Technical Transfer
★ EVI etc.
Thank you for your kind attention

END