A strategic partner in the global automotive industry - A Tata Steel Case Study

Mr Anand Sen, President TQM and Steel Business, Tata Steel Ltd
<table>
<thead>
<tr>
<th></th>
<th>Global context</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Asia Growth – a catalyst for change in India</td>
</tr>
<tr>
<td>3</td>
<td>Two decades of automotive focus</td>
</tr>
<tr>
<td>4</td>
<td>Drawing on global R&amp;D and technology capability</td>
</tr>
<tr>
<td>5</td>
<td>Results show the success of effort</td>
</tr>
<tr>
<td></td>
<td>Contents</td>
</tr>
<tr>
<td>---</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>Global context</td>
</tr>
<tr>
<td>2</td>
<td>Asia Growth – a catalyst for change in India</td>
</tr>
<tr>
<td>3</td>
<td>Two decades of automotive focus</td>
</tr>
<tr>
<td>4</td>
<td>Drawing on global R&amp;D and technology capability</td>
</tr>
<tr>
<td>5</td>
<td>Results show the success of effort</td>
</tr>
</tbody>
</table>
The Tata Group is
global business group
with products and services in over 150 countries
over 660,800 employees and operations
in over 100 countries
group revenue of $103.51 bn
with 67.3% generated in geographies other than India
global leader in several sectors
Amongst the most global dispersed steel partner

- FY17 deliveries: 23.88 MT.
- FY17 Group turnover: ~ $18.3bn.
- Manufacturing units in 26 countries,
- Amongst the Fortune 500 companies

10.97 MT from Indian operations.
Group EBITDA: ~ $2.6bn.
~77,000 employees worldwide
Automotive focused assets of Tata Steel

IJMUIDEN, NL
- Hot Rolled products for chassis and wheels
- HDG for FF application as well as internals
- AHSS up to 800 MPa in HR
- AHSS up to 1000 MPa in HDG

PORT TALBOT, UK
- Hot Rolled products for chassis and wheels
- HDG for FF application as well as internals
- AHSS up to 800 MPa in HR
- AHSS up to 1000 MPa in HDG

JAMSHEDPUR, IN
- Hot Rolled products up to 800 MPa
- CRCA up to 590 Mpa (upgradeable to 780 Mpa)
- GA/GI up to 590 Mpa
- Capability for FF (exposed panels)
- Secondary coatings (e.g. polymer) for FT application

KALINGANAGAR, IN
- Hot Rolled products up to 1200 MPa
- Hot Stamped grade capability
- Wider widths up to 2050 mm
- Thickness up to 25 mm
# Contents

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Global context</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Asia Growth – a catalyst for change in India</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Two decades of automotive focus</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Drawing on global R&amp;D and technology capability</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Results show the success of effort</td>
<td></td>
</tr>
</tbody>
</table>
Chinese dominance

Chinese share of global car market

- 2000: 4.0%
- 2005: 9.0%
- 2010: 19.1%
- 2015: 20.7%
- 2020: 24.9%
- 2025: 30.0%

Source: Statista
Motor vehicles production in 2016

Total global production 2016: 95 million

Source: Organisation Internationale des Constructeurs d'Automobiles (OICA)
Headroom for further growth

Motor vehicles per capita

USA: 797
Japan: 591
Germany: 572
S. Korea: 459
China: 140
India: 32

A strategic partner in the global automotive industry
Indian growth – early days

Source: Society of Indian Automobile Manufacturers (SIAM)
Tightening emission norms

Year of introduction


Bhatat/Euro II  Bharat/Euro III  Bharat/Euro IV  Bharat/Euro V  Bharat/Euro VI
### Different geographies, common goals

<table>
<thead>
<tr>
<th>Legislative Drive</th>
<th>Consumer Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Safety</td>
<td>Performance</td>
</tr>
<tr>
<td>Emission Control</td>
<td>Convenience</td>
</tr>
<tr>
<td>End-of-Life</td>
<td>Luxury</td>
</tr>
</tbody>
</table>

- Vehicle Safety: Compliance with safety regulations, accident prevention, and occupant protection.
- Emission Control: Reduction of pollutants, efficiency, and sustainability.

- Performance: High efficiency, speed, and reliability.
- Convenience: User-friendly, ease of use, and accessibility.
- Luxury: Comfort, style, and exclusivity.
- Love to drive: Enthusiasm, enjoyment, and emotional connection.
- Appeal: Aesthetic, brand image, and market presence.
## Contents

1. Global context
2. Asia Growth – a catalyst for change in India
3. Two decades of automotive focus
4. Drawing on global R&D and technology capability
5. Results show the success of effort
Multiple initiatives

Customer engagement framework: VAVE, customer service teams

Investment in facilities and technology

Increasing customer base and reach
Multi-facetted effort over two decades

Tata Steel

A strategic partner in the global automotive industry

TSL initiatives with Auto OEMs
- Import Substitution (HR product dev.)
- ERP (SAP) implementation

TSL investments in Facilities / Technology
- Hot Strip Mill
- RH degasser
- World Class Service Centers

Market Share ramp-up in Auto segment (%)
- HR localization
- CR localization

Period →
- 1995
- 2000
- 2005
- 2015
- 2020

Customer Partnership*
* Period in which relationship begun

Hi-end focus – CR Skin and coated localization for 2W

Hi tensile localization & Coated Skin Panel
Tyre bead & Tyre cord

36% 42% 43%

AHSS / UHSS localization & Coated Skin Panel

EVI support
- Product Application & Research Centre (PARC)
- Welding & forming labs

- KPO HSM (Auto grades)
- KPO CAPL/CGL
- CRM Bara Phase 2

- VAVE support
- Global Account Management
- Customer Relationship Management (CRM)

- DP Grades from TSCR for HR up to 800 MPa
- JV with NSSMC for CAPL for CR up to 590 MPa

- Automatic Scarfing machine
- Electrolytic cleaning Line
- Auto Galvanizing Line
- Cold Rolling Mill

- VMI with select customers
- Supply Chain (I2)
- Customer Value Management (CVM)

- EVI (Toyota, Ford)
- Dedicated Sales & Application Engineer

- CRM

- Sanand:
Customer engagement framework

- **Early Vendor Involvement & Downstream Solutions**
- **Cost and weight reduction**
- **Customer Service Teams**

Increasing level of engagement with customer

- **Value analysis / Value Engineering**: Grade Change, elimination and integration of parts and engineering solutions
- **Complete product portfolio and capability offerings**, Structural supplies in Construction
- **New grade and product development**
- **Operational efficiency improvement**
- **Elimination of hygiene problems**

Duration:
- **> 2 year**
- **< 2 year**
- **< 1 year**
- **< 3 months**

* Technical support by NSC  ** Cooperation with TSL-Europe  *** enhanced product portfolio through KPO

A strategic partner in the global automotive industry
Focussed engagement

<table>
<thead>
<tr>
<th>Forums / Initiatives</th>
<th>Auto CST</th>
<th>Non CST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sr. Management interaction</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>VAVE initiative</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>Driving Steel / Technology Day</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>R&amp;D Support – Circle Grid analysis / Die Scanning</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>Vendor Service Model</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>PAG Support / Customer Feedback</td>
<td>✔ ✔</td>
<td></td>
</tr>
<tr>
<td>Customer Satisfaction Survey</td>
<td>✔ ✔</td>
<td></td>
</tr>
</tbody>
</table>

Greater degree of interaction with CST customers through multiple forums and touch points helps in cementing relationship.
Key aspect of Value Driver is to stay relevant

- Development of hi-end grades for Nissan, Toyota and Hyundai
- Increase in NPD from new facility

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of NPD</th>
<th>% NPD Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12</td>
<td>11</td>
<td>4.0%</td>
</tr>
<tr>
<td>FY13</td>
<td>6</td>
<td>7.3%</td>
</tr>
<tr>
<td>FY14</td>
<td>9</td>
<td>7.6%</td>
</tr>
<tr>
<td>FY15</td>
<td>16</td>
<td>18.2%</td>
</tr>
<tr>
<td>FY16</td>
<td>23</td>
<td>23.4%</td>
</tr>
</tbody>
</table>
## Offer differentiated services – VA/VE

<table>
<thead>
<tr>
<th>Vehicle Type / Class</th>
<th>When</th>
<th>Potential Saving ($) per vehicle</th>
<th>Input Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Car (Mini Segment)</td>
<td>Oct 2016</td>
<td>26</td>
<td>Production</td>
</tr>
<tr>
<td>Compact SUV</td>
<td>Oct 2016</td>
<td>26</td>
<td>Production</td>
</tr>
<tr>
<td>Heavy Commercial Vehicle</td>
<td>Apr 2015</td>
<td>99</td>
<td>Production</td>
</tr>
<tr>
<td>B-class Passenger Car</td>
<td>Jun 2014</td>
<td>17</td>
<td>Production</td>
</tr>
<tr>
<td>Pick-up truck</td>
<td>Dec 2013</td>
<td>26</td>
<td>Production</td>
</tr>
<tr>
<td>Passenger Car (B-class)</td>
<td>Mar 2013</td>
<td>31</td>
<td>Production</td>
</tr>
<tr>
<td>Passenger Car (C-class)</td>
<td>Mar 2013</td>
<td>33</td>
<td>Production</td>
</tr>
<tr>
<td>Passenger Car (B-class)</td>
<td>Sep 2012</td>
<td>37</td>
<td>Development</td>
</tr>
<tr>
<td>SUV</td>
<td>Apr 2012</td>
<td>35</td>
<td>Production</td>
</tr>
<tr>
<td>3 - Wheeler</td>
<td>Nov 2011</td>
<td>17</td>
<td>Production</td>
</tr>
</tbody>
</table>
## Contents

1. Global context
2. Asia Growth – a catalyst for change in India
3. Two decades of automotive focus
4. Drawing on global R&D and technology capability
5. Results show the success of effort
Investment in Automotive Technology Centres

Tata Steel Europe
R&D Product Applications Centre
The Netherlands

Products and forming research Tata Steel
Jamshedpur, India

Tata Steel Europe
R&D Warwick Technology Centre
United Kingdom
Advanced Centre for Welding & Joining

Can provide process parameters for different steel grades.

- Help resolving weld shop issues.
- Simulate weld shop joining at lab scale for process optimisation.
- Suggestions about advanced welding / joining methods.
Advanced product application support

**Material data**
- Robustness in analysis
- FLC modelling

**Material modelling**
- Model for springback prediction
- Fracture & damage modelling
- Combined hardening models

**EVI services**
- VA/VE
- Concept development
- Design optimisation
- New product introduction

**Simulation techniques**
- Formability simulations
- Sheet Metal forming / rollforming etc.
- Springback & compensation
- In-service performance modelling
- Forming-to-X
- Applicable to crash / fatigue / strength / ..
Case study: ultra light tipper load body

- Lighter tipper load body
  - Extensive use of Ultra High Strength Steels
  - Design innovation to maintain stiffness
- Over 12% weight reduction with better performance.
Value Analysis and Value Engineering

- Rolled out in India in 2011.
- More than 35 models, which includes 4W, 2W and heavy commercial trucks, covered.
- With both domestic and global OEMs like Renault Nissan and Volkswagon
- Average wt. save 20 kg and average cost save of $30 per vehicle.
With global automotive companies

- Cost down-weight down exercise on 9 different models from Renault, Nissan and Volkswagon in India with average saving potential of $15-20 per vehicle.
Advanced model for springback

**Also refer benchmark problem - 4 at NUMISHEET-2011.**
## Contents

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Global context</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Asia Growth – a catalyst for change in India</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Two decades of automotive focus</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Drawing on global R&amp;D and technology capability</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Results show the success of effort</td>
</tr>
</tbody>
</table>
Indian volume growth

A strategic partner in the global automotive industry

Figures in ‘000 MT

Tata Steel
Domestic Indian market: share growth

% market share

0 5 10 15 20 25 30 35 40 45 50


A strategic partner in the global automotive industry
Tata Steel supports global players on four continents

Developing with OEM and its tiers solutions to supply into NAFTA, Europe and Asia

Design and development and supply into growing global operations

European, Asia and South Africa supply for global platforms. Design support in UK, France and Japan

Supply to Europe, Mexico and local sourcing for India

Full service supplier to global operations in Car, Bus and Truck. Supporting design and development in Pune and Coventry, UK

NAFTA, Europe, South Africa and Asia supply relationships, long established

Supporting developing positions in Africa and Asia

Supporting expansion ventures in NAFTA and the development of other Geely brands globally
Thank you