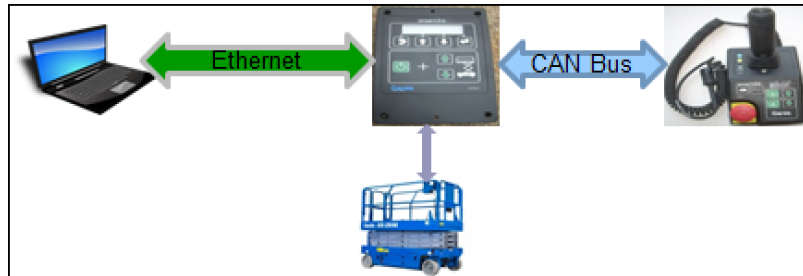


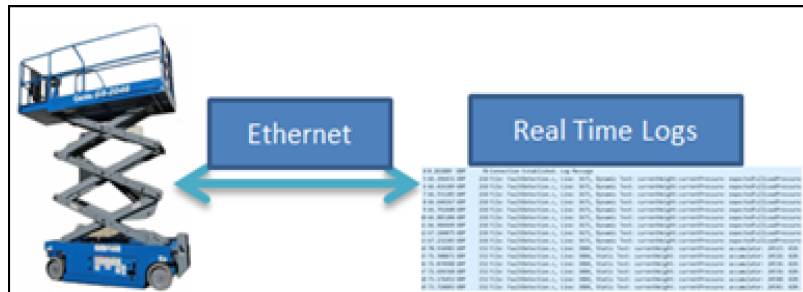
### Control System Engineering

- Control system design-hardware and software
- Application Engineering
- Application software development
- Control system deployment and commissioning
- Control system migration services
- Integration of control system (across platforms and applications)
- HMI/GUI Design
- Remote monitoring services (design, configuration and implementation)



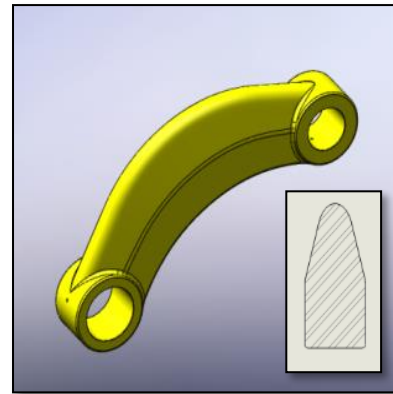
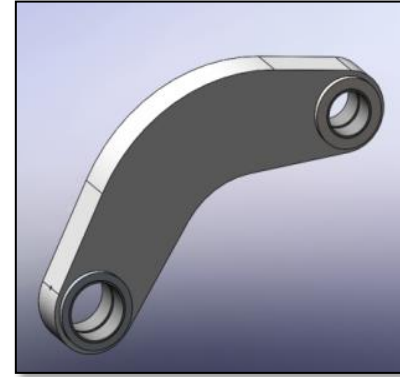
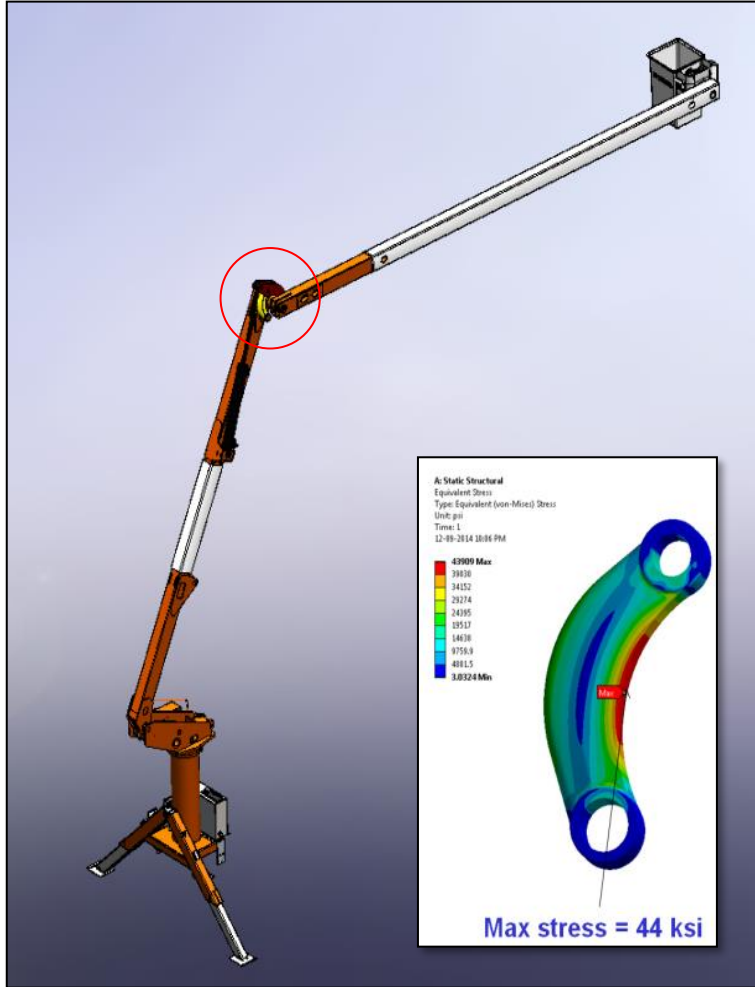
### Embedded System & Product Engineering

- Requirements gathering and modelling
- System design
- Application software development
- Unit testing, System Validation
- Test Automation-Verification and Validation
- HMI/GUI Design
- Concept, Analysis, Design
- Prototype & Test
- Certification
- Product





## Product Cost Reduction



### Banana Link: Mfg. Process Optimization

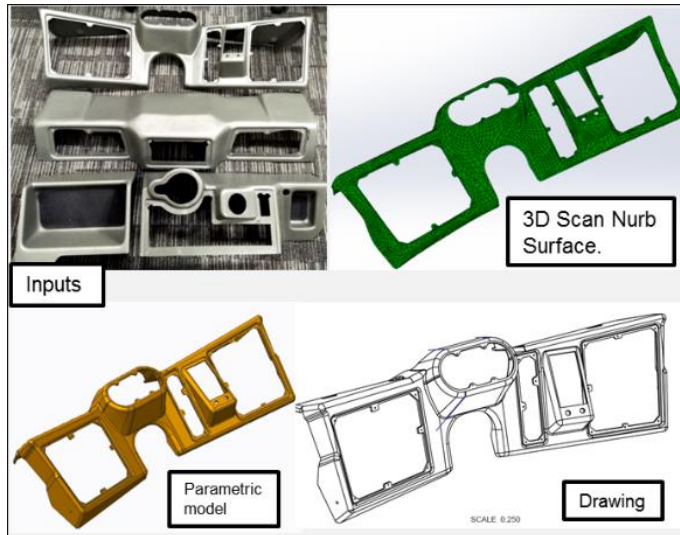
- New design of existing fabricated link as a casting
- Water jet cutting of existing link was too expensive; New casting was 60% cheaper to produce
- Force calculations & FE Analysis of casting design
- Vendor identification through Global Sourcing
- Approximate Annualized Savings = US \$65,000

# Strategic Sourcing Support



## Fabrications

- Parts Classification
- Drawings Template updating for legacy drawings
- New drawings creation for individual piece parts separately
- Drawings note translation from German to English, Italian to English
- Generation of excel spreadsheet with material grades and thickness of plates used in fabrication for EMEAR and NA sites



## Cabins

- Dash Panel reverse Engineering
- Drawings Creation
- Specification's documentation

## Strategic Sourcing Support



### Hydraulics

- 3D models and drawings creation for Hydraulic Components: Cylinders, Pumps & Motors, Manifold Blocks, Oil coolers.
- Drawing's notes/texts translation from German to English
- Specification's documentation (including functionality)
- 3D models and drawing creation for hydraulic fittings, tubes and hose-end fittings

### Electricals

- Categorized the kits & assembly parts in the Top 80% spend components
- Listed out the mechanical parts used in kits & assemblies
- Studied the component drawing & provided the comments about missing specifications
- Studied the component drawing & validated specifications provided for RFQ



### Running Gear

- Drawing and model extractions, spec sheet generation
- Translation of spec sheet from DE/IT to GB

## Special Projects



*TL60i/ TL55i  
New Design*



### Metrification Project for Telescopic Aerial Devices

#### Scope/Overview:

- Metrification of all the components of the TL60 machine and TL55 machine looking into cost , supply chain and manufacturability . Localize all the components where it is possible.

#### Key contributions/Value add:

- Weight study ,design calculations to reverify the impact of metrification and material change.
- Tolerance analysis for all altered components.
- New cylinder selection for 10 cylinders in the machine from multiple local supplier options , Approval of the new cylinders.
- New Gear box ,slew bearing , eccentric ring and motor, hydraulic components like valves, fittings selection for localization . New Boom Design for TL55i.
- Structural validation through FEA for TL60i
- Strain gauging and Life cycle test support to CZ team.
- Supply chain Engineering support to localizes 1200+ components.

# Special Projects

5.0 List of Equivalent/Alternate Grades for European Steel									
EUROPE		ASTM		INDIA			CHINA		
S/N	Material	Standard	Material Designation	Material Designation	Standard	Source / Mill	Material Designation	Standard	Source/ Mill
1	DD11	EN 10111	CS Type-B ASTMA 1011	D	IS:1079	SAIL Jindal Essar Tata	DD11	EN 10111	Wisco Bao
				HR4/HS4	BS:1449		SPHC	JIS G 3131	
				SPHC	JIS G 3131				
2	DC01	EN 10130	CS Type-B ASTMA 1008	D	IS:513	SAIL Essar Tata	SPCC	JIS G 3141	Wisco Bao
				CR4/CS4	BS:1449		DC01	EN 10130	
				SPCC	JIS G 3141				
				Steelium DQ	Mill Spec		Tata		

ITEM_NUMBER	DESCRIPTION	USA HTS Code	EUROPE HTS Code
2217311317C	""""WATER TANK CAP""""	3923.50.0000	3923509000
340702-569	"14"" HUB ASSY. 8 BOLT"	8431.49.1090	8431498000
340702-610	"14"" HUB ASSY. 8 BOLT"	8431.49.1090	8431498000
342076-146	"A/C BELT (77""")"	4010.39.1000	4010390000
340402-243	"ARM;WIPER;15-19""""	8512.40.4000	8512400090
340702-369	"ASSY HUB 14"" 8 BOLT"	8431.49.1090	8431498000
342036-114	"ASSY HUB SPOOL 15"" (CAT"	8431.49.1090	8431498000

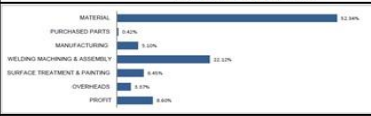
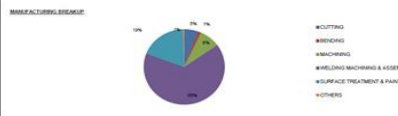
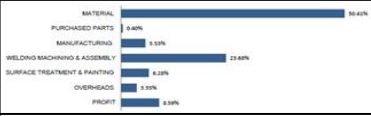
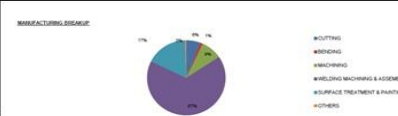
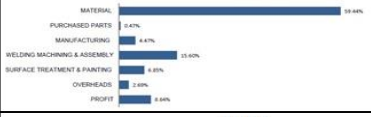
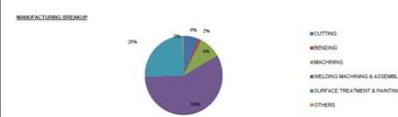
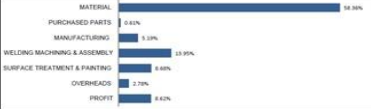
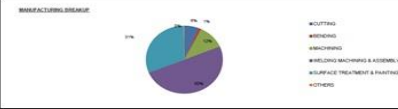
## Terex Steel Handbook of comparative Grades

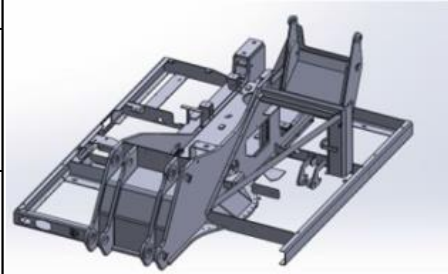
- Documentation contains Equivalent or Alternate steel grades for the specifications of European, American & Asian steel grades with their comparisons
- Developed consistent Methodology for selection of Equivalent/Alternative material Grades
- Specification includes Structural steels, Bars, Tubes, Sections and Castings
- Guidelines for the Qualification and Certification of Steel. Steel Handbook is available in Printed hard copy

## HSN Parts Codification

- HSN- Harmonized System of Nomenclature is classification of Parts imported / Exported into the country.
- Commodity code classifies Parts based on its name, use, and/or the material used in its construction.
- Classification Code contain 10-Digit number for Import and 8-digit number for Export and are country specific used for Import/Export of items for the country. eg;
  - European Code -- 7318157098
  - USA Code -- 7318.15.2095

## Special Projects

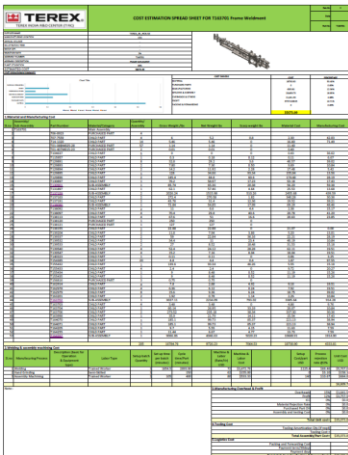
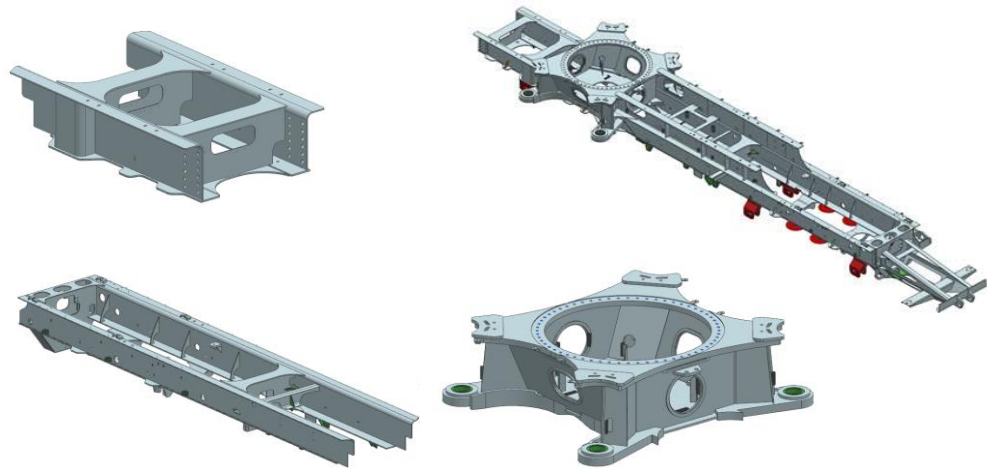
Costing Overview		Manufacturing Cost breakup	
<b>Czech Republic</b>			
	€ 6,620.26		<ul style="list-style-type: none"> <li>CUTTING</li> <li>WELDING</li> <li>MACHINING</li> <li>WELDING MACHINING &amp; ASSEMBLY</li> <li>SURFACE TREATMENT &amp; PAINTING</li> <li>OTHERS</li> </ul>
<b>Poland</b>			
	€ 6,872.68		<ul style="list-style-type: none"> <li>CUTTING</li> <li>WELDING</li> <li>MACHINING</li> <li>WELDING MACHINING &amp; ASSEMBLY</li> <li>SURFACE TREATMENT &amp; PAINTING</li> <li>OTHERS</li> </ul>
<b>Hungary</b>			
	€ 5,828.36		<ul style="list-style-type: none"> <li>CUTTING</li> <li>WELDING</li> <li>MACHINING</li> <li>WELDING MACHINING &amp; ASSEMBLY</li> <li>SURFACE TREATMENT &amp; PAINTING</li> <li>OTHERS</li> </ul>
<b>India</b>			
	€ 4,564.21		<ul style="list-style-type: none"> <li>CUTTING</li> <li>WELDING</li> <li>MACHINING</li> <li>WELDING MACHINING &amp; ASSEMBLY</li> <li>SURFACE TREATMENT &amp; PAINTING</li> <li>OTHERS</li> </ul>



### Should Costing

#### Material Handler Upper Carriage

- Input : Drawing and 3D models
- Deliverables:
  - Should costing report for Czech Republic, Poland, Hungary & India.
  - Nesting report of parts, weld length, time & deposition calculation
- Tool Used: Programmed Excel

### Crane Chassis

- Input : Drawing and 3D models of 4 welded structures constituting 240 parts
- Deliverables:
  - Should costing report for manufacturing in USA
  - Report included cost of raw material, manufacturing, welding, assembly, scrap, etc.
- Tool Used: Programmed Excel