

Management
Briefing Seminars
2007



World Class Manufacturing

Driving to Lean Product and
Process Development

consulting

MBtech Consulting

Critical Success Factors in the future of the
Automotive Industry

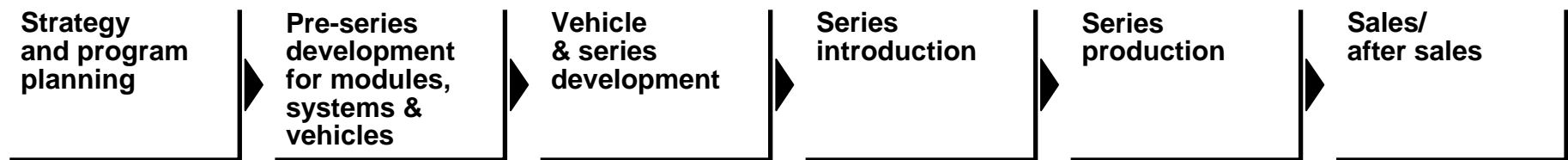
Focus: Steel



Traverse City, August 2007

A brief overview of Mercedes-Benz Technology and Mercedes-Benz Consulting

By combining engineering and consulting services MBtech offers its customers a high degree of added value



STRATEGIES, TECHNOLOGIES, PROCESSES

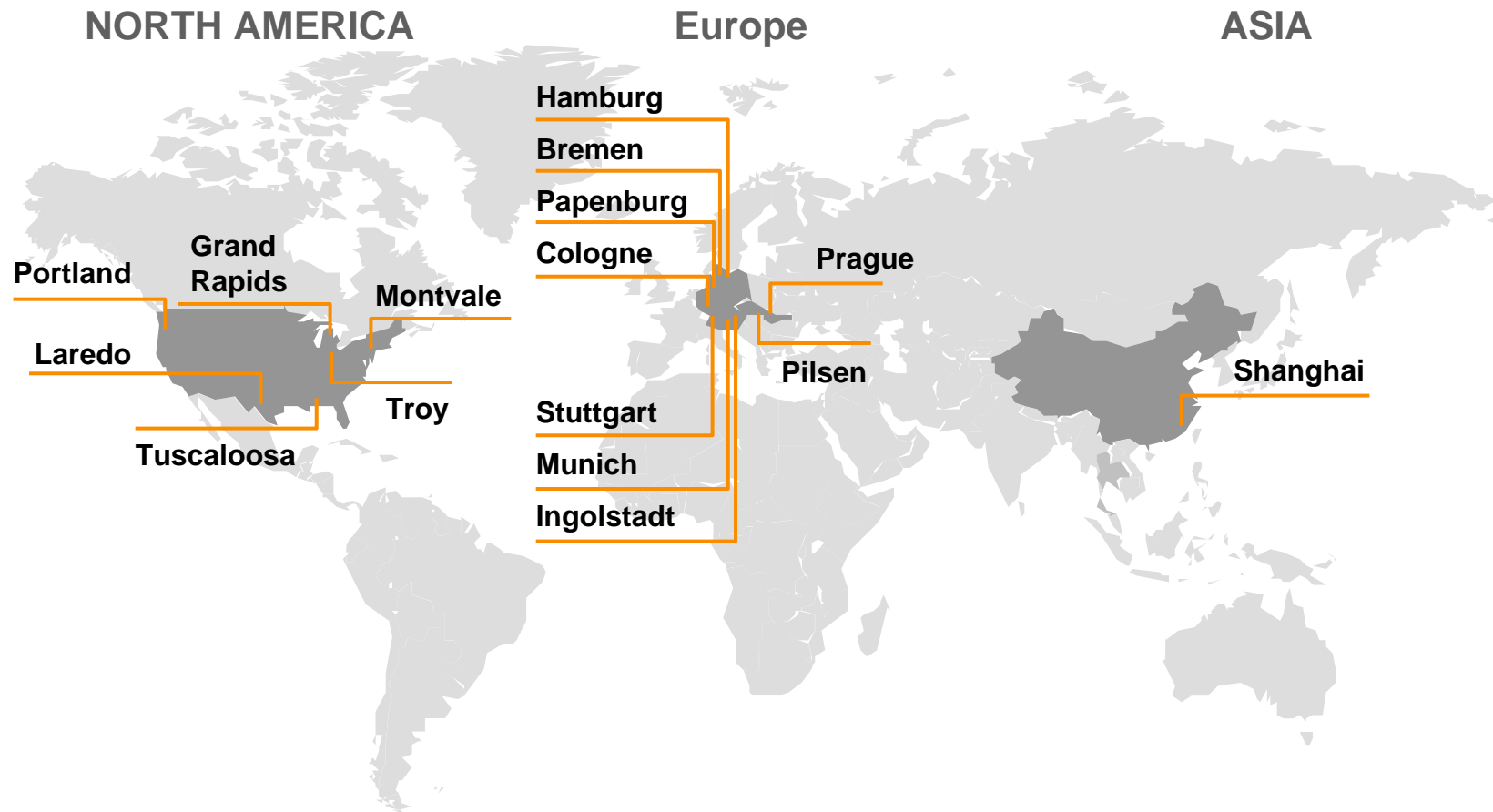
MBtech Consulting services

Automotive Know-How

MBtech Engineering services

PRODUCTS

MBtech ensures a close relationship to its customers by its international presence



MBtech ranks among the top 10 suppliers of engineering and consulting services

Ranking 2007	Ranking 2006 ¹⁾	Company	Turnover 2006 [EUR m]
1	(-)	Pininfarina	600.0
2	(2)	AVL List	532.0
3	(1)	EDAG Engineering	511.7
4	(4)	IAV	252.0
5	(6)	Bertrandt	241.1
6	(12)	Ferchau	210.0
7	(7)	Magna Steyr	200.0 ²⁾
7	(8)	MBtech Group	200.0
9	(9)	ESG	186.0
10	(12)	FEV	175.0

1) Basis: Turnover 2005 2) Engineering services only

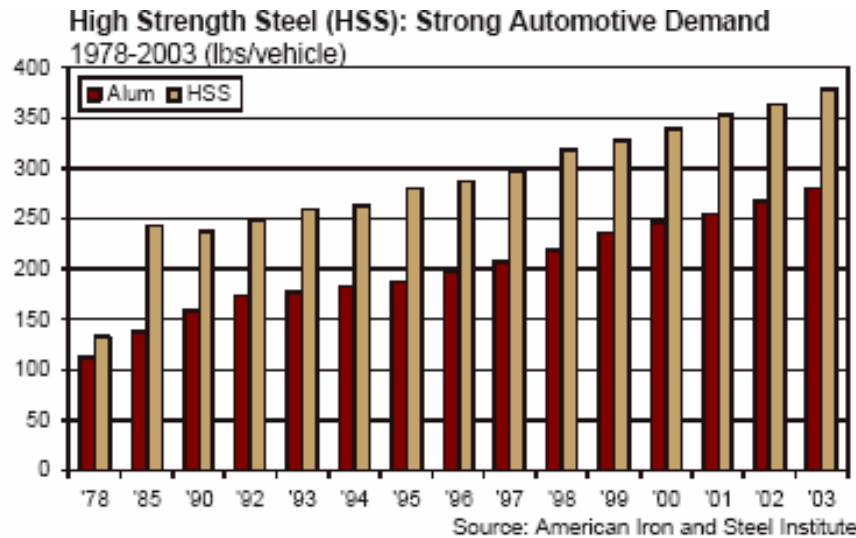
MBtech has based its business model on three future Market Drivers

- **Complexity**
 - Vehicles will become far more complex in their design, sourcing, fabrication, assembly, and sale
 - Dedicated manufacturing processes are becoming the norm
 - Flexible assembly methods are used to manage complexity today

- **Collaboration:**
 - Further collaboration will be necessary to reduce the risk presented by global markets
 - Transparency and a deep appreciation for Risk must be evident
 - Simplified organizational structures are disruptive to the collaboration process

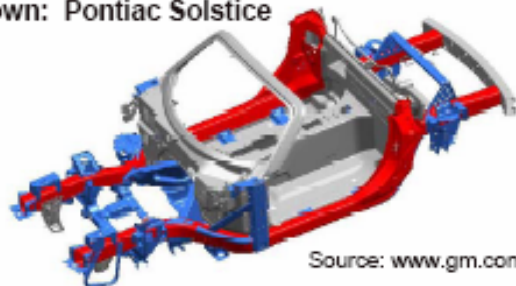
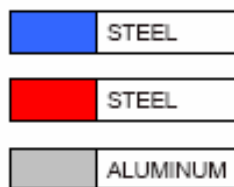
- **Innovation**
 - Innovations will be driven by markets, consumers, OEM's and suppliers
 - Offsets must be considered when implementing Innovative Products
 - Our focus on innovation sometimes leads us down some very unbeneficial paths

Complexity: Steel usage trend indicates greater application specialization is expected



- Steel Content in an average light vehicle built in 2003 was 64%
- It is likely that HSS will continue to be the most pound for pound material used for the foreseeable future
- The development and use of high-strength are keeping steel the preferred choice over aluminum, composites, and cast iron
- Advanced high strength steel (AHSS), which is a bi-metallic material, enables the use of less material, which results in weight reduction
- Steel requires less energy to produce than aluminum, which means less carbon dioxide is emitted during the production process
- Steel is the most recycled material given that fact it is easily sorted, given its magnetic characteristic, and easily recycled for multiple uses

Frame Material Breakdown: Pontiac Solstice



Key Enabler: “De-Sensitize” the steel fabrication process



MBtech Autodie is working with DaimlerChrysler to develop a “desensitized” fabrication processes.

The focus of this process is to allow for variable material grades to be utilized in the same process.

Grade variables would include:

- Material Thickness
- Alloy

Rationale: Increased variability in grades of steel utilized on given vehicles

- Example: Dodge Avenger: 30% by weight High Strength Steels

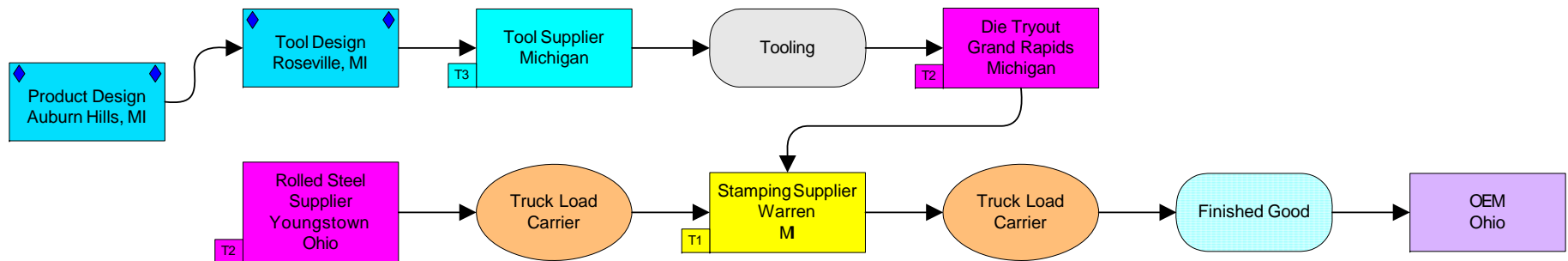
The largest danger to the automotive marketplace is the understanding and management of risk

.....we are seeing 30 – 40% savings by re-Sourcing product to Eastern Europe, India, Korea, and China.....

NOTE: Credited to various Consultants, Business Advisors, and Procurement Executives....

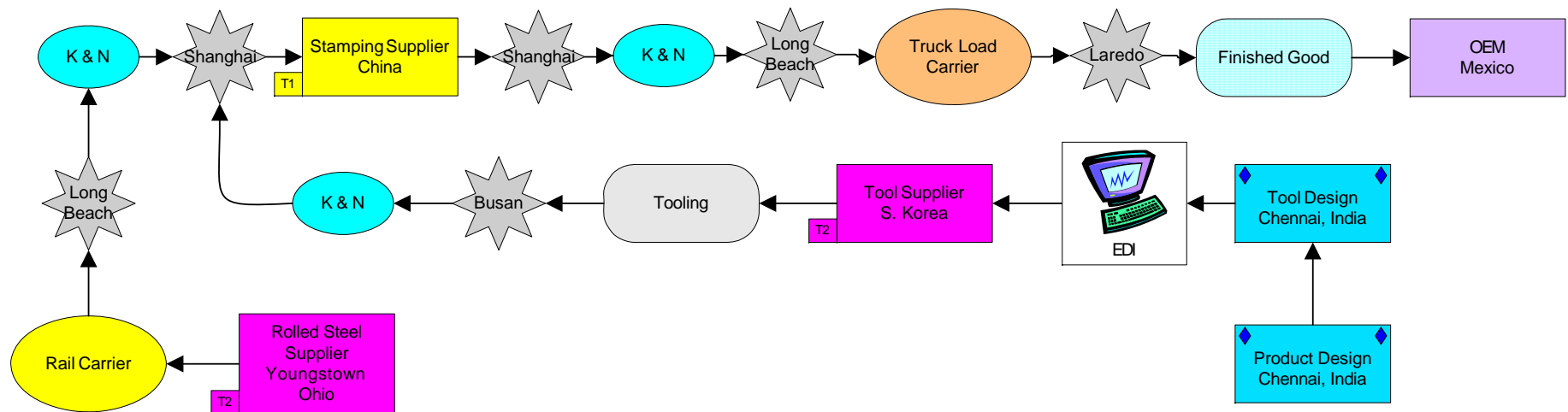
Global Value Streams change the Risk Profile

“Old School” Steel Value Stream



Global Value Streams change the Risk Profile

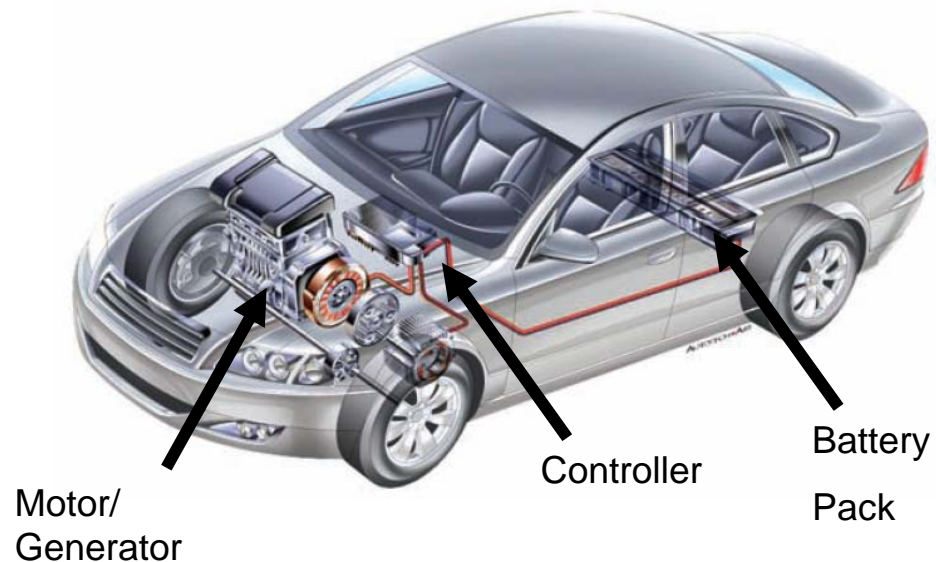
“New Age” Steel Value Stream



Transparency: System Level Cost Analysis allows for Risk to be evaluated with every decision

	China to Michigan	Indiana to Michigan
Piece Price	\$35	\$50
Raw Material Transportation (MI to China) vs. (MI to IN)	\$4.00	\$.80
Transportation per Piece Ocean/Rail/Truck vs. Truck Only	\$9.94	\$.79
Packaging per Piece Expendable vs. Returnable	\$1.14	\$.14
Inventory Carrying Cost	\$.58	\$.10
Floor Space Cost	\$.08	\$.02
Total Landed Cost per Piece	\$50.74	\$51.85
Premium Freight Risk	\$250,000/per transport	\$1000/per transport
Total Inventory Cost In supply Chain	\$577,500	\$100,000

Innovation drives concessions



MBtech's has a deep involvement in Hybrid Solutions. Hybrid solutions typically add more than **500** pounds to the vehicle:

- New Hybrid Transmission (Motors + Housing)
- Control Units
- High Voltage Cables
- Cooling Systems
- Batteries
- Battery Tubs
- Regenerative Braking Solutions

Source:

Michael Jensen article in Design Line

Key Enabler: Offsets must be taken in the vehicle body construction to compensate for addition weight

MBtech's Total Vehicle Engineering solutions is working with AISI and DaimlerChrysler to create a Light Weight Body solution that allows for offset considerations to be made in Body Construction:

1. High Strength Steels
2. Dual Phase Steels
3. Hot Formed Steels

4. Use of Alternative Construction methods for the fabrication of closures, such as:
 - Doors
 - Decklids
 - Hoods

Rules of Thumb to consider:

- Crains Automotive - March 12, 2007: OEM's will need to spend €210+/vehicle to reduce weight by 5% (~250lbs)

- Other alternatives, such as content reduction, will be received less favorably by the consumer

Closing Remarks

- Complexity cannot be stopped, therefore it must be managed within the process.....
- Past organizational efforts to make value streams easier to manage have left OEM's open to Risk....
- Innovations will occur, but they will come with a price. This price must be paid elsewhere.....
- Think globally, act locally. The future you protect is for your own children, your own state, and your own nation.

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