“BEST PRACTICE” R&D
VIEW FROM A LARGE TIER ONE SUPPLIER

- SWAMY KOTAGIRI
EXECUTIVE VICE PRESIDENT - ENG, R&D

COSMA INTERNATIONAL
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Agenda

• Magna /Cosma Overview

• Fundamental vs. Application Research

• R&D Process

• Case Studies

• Industry Collaboration

• Conclusions
MAGNA / COSMA OVERVIEW
Global Capability

- Roof Systems
- Exteriors
- Interiors
- Vision Systems
- Seating
- Electronics
- Powertrain Systems
- Closures
- Body & Chassis Systems
- Hybrid & Electric Vehicles/Systems

Engineering + Services
Product Systems
Vehicle Assembly
Global Locations

Manufacturing + Engineering

41 Production/ 21 Engineering, R&D & Sales/ 7 Tooling | ~ 16,800 People

LEGEND:
- ● Manufacturing
- ▲ Product Development, Engineering Centers and Sales
- ◊ Tooling
- * Count includes JV Locations

NORTH AMERICA
- Canada: 22, 4, 3
- USA: 8, 1, 2
- Mexico: 5, 1

EUROPE
- Austria: 11, 9, 1
- Czech Republic: 1
- France: 2, 1
- Germany: 3, 6
- Ireland: 1
- Poland: 1
- Slovakia: 1
- Russia: 1

ASIA
- China: 7, 8, 3
- India: 1, 1
- Japan: 4
- Korea: 4, 1, 2
- Thailand: 1, 1

SOUTH AMERICA
- Brazil: 1
Cosma produces a complete range of body-in-white solutions from small stampings up to fully assembled body-in-white modules such as the SMART roadster built for Daimler in Europe.

- Exterior Sheetmetal
- Closures Systems
- Body Structure Assembly
- Energy Management Solutions

Cosma is a market leader in complete chassis structure assemblies and modules. A variety of innovative metalforming processes including hydroforming, rollforming, stamping and bending can be applied to meet specification.

- Complete Chassis Modules
- Frames, Subframes & Cradles
- Suspension Links & Arms
Process Expertise

**body + chassis systems**

**HYDROFORMING**
Hydroforming allows for flexibility in product design, reduction in the number of system components and enhanced vehicle performance.

**ROLLFORMING**
Cosma brings rollforming of ultra high strength materials to a new level. With the ability to pierce, weld and tightly bend (sweep), rollformed components in sequence.

**STAMPING**
Our Class A and body structure solutions strive to exceed customer targets for weight and crash performance through innovative manufacturing processes.

**BENDING**
Innovative bending technologies are continuously under development to support ongoing product and process improvements.

**HOT STAMPING**
Cosma has taken an industry lead in bringing this forming process to body structure applications. These include body pillars, rockers, roof rails, bumpers and door intrusion beams.

**ASSEMBLY**
Our capabilities range from complete closure systems, chassis modules and full frame assemblies to fully assembled body-in-white modules.
Areas of Expertise

Body + Chassis Systems

Research & Development

- Hybrid Structures
- Hot Stamping
- Advanced Joining Technologies
- Advanced High Strength Steels
- Flexible Assembly

Engineering

- Concept Development
- Program Management
- Virtual Tools
- Prototyping
- Testing & Validation

Cosma has multiple facilities worldwide focused on advanced engineering, research and development. The constant stream of innovation that flows from these R&D centers is aimed at the goal of providing our customers with a "Better Product for a Better Price™".

Our global engineering presence has proven itself in the areas of complete vehicle program management, product and process engineering, virtual engineering, prototype and testing.
FUNDAMENTAL VS. APPLICATION RESEARCH
Drivers for Change

CAFE STANDARDS

EMISSION STANDARDS

CHANGING AUTO INDUSTRY

IMPROVED SAFETY STANDARDS

DRIVERS FOR CHANGE
Fundamental vs. Application Research

**DRIVERS**
- CAFE
- EMISSIONS
- CUSTOMER NEEDS
- SAFETY
- COST

**RESEARCH**
- FUNDAMENTAL RESEARCH
  - UNIVERSITIES
  - NATIONAL LABS
- Eg. NEW ALLOY

**DEVELOPMENT**
- APPLICATION RESEARCH
  - PRODUCT/PROCESS DEVELOPMENT
  - TIER ONE SUPPLIER
- NEW PRODUCT/PROCESS

**PRODUCTION**
- MASS PRODUCTION
  - OEM & TIER ONE COLLABORATION
Checklist for scientific and technical evaluation of a project:

- Will the existing Product:
  - Become cheaper?
  - Become lighter?
  - Be more efficiently made?
  - Create a new market or fill an existing market gap?
  - Have same or better performance?
R&D Process

PHASE I
- Gate 1
- Idea Generation
- Paper Study
- Proof of Concept

PHASE II
- Gate 2
- Concept Evaluation and Demo
- Product Realization and Validation
- Industrialization
- Gate 3
- Pre-Series Production Support
- SOP
- Launch

PHASE III
- Gate 4
- Production and Continuous Improvement
- Start of Production at end of Phase III

DRIVERS FOR CHANGE
MAGNA
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CASE STUDIES
Front End Structural Module (FESM)

**Drivers for Change**
- Crash / safety
- CAFE / CO2 = Weight Reduction
- Product Stiffness
- Product Size / Design Constraints

**Idea Generation**
- Tubular front end to replace traditional design
- Challenge = Joining tubes together

**Concept Evaluation and Demo**
- New joining process
- Fundamental research = Material selection

**Product Realization and Validation**
- Application research = Development of Tubular FESM
- Prototypes

**Pre-Series Production Support**
- Industrialization
- Production launch

**Resistance**
- Brazed Spot Welding
Hot Stamping

DRIVERS FOR CHANGE

- Roof crush / safety
- CAFE / CO2 = Weight Reduction
- Increased performance

- Ultra high strength materials in key body structure areas
- Challenge = Economical process

- Tooling technology
- Fundamental research = Material treatment

- Application research = Tooling
- Prototypes

- Industrialization
- Production launch
INDUSTRY COLLABORATION
Collaboration

Drivers for Collaboration:
- Changing requirements
- Technology enablers
- Future vehicles

Vehicle, component design, and mfg expertise
- Develop theoretical materials data
- Verify crash and durability performance

Program Management
- Funding
- Materials development

Expertise on full system design
- Testing
- Identify requirements

CONSORT-IUMS

GOV’T

TIER ONE SUPPLIERS

AUTOMAKERS

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Conclusions

• Drivers for Change in the industry require innovative and cost effective solutions

• The OEMs quest to remain competitive requires a strong supply base who invests in innovation

• Innovation will come to market more effectively with increased OEM / supplier collaboration

• Collaboration needs to occur across industries and disciplines

• Phased objective approach will improve ROI on R&D investment
THANK YOU