



The Development of Innovation Capacity in China and India

Automobiles and Aerospace Manufacturing

25. September 2007



This material accompanied a verbal presentation and as such is not a complete record.

INCAT Confidential

Introduction to INCAT

- Leading independent Engineering Services and Product Development IT services company.
- Established in 1984 as an engineering services business.
- Acquired by Tata Technologies (a Tata Group company) in 2005, adding a significant offshore component to an established end-to-end automotive and aerospace engineering services portfolio.
- \$250M revenue. Now over 3,500 employees in 13 countries.
- Partnered with the leading automotive and aerospace OEMs.

Automotive Domain Experience



| | Conc'pt Eng'g | Adv'd Eng'g | Class A | BIW | Interior | Exterior | Chassis | E/E | PT | CAE / FEA | Man'g |
|--------------|---------------|-------------|---------|-----|----------|----------|---------|-----|----|-----------|-------|
| Chrysler LLC | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| GM | ○ | ○ | ● | ○ | ● | ● | ○ | ● | ● | ● | ● |
| Ford Group | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Tata Motors | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Toyota | ○ | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● |
| Honda | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Lotus | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |



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Selected Reference Projects



Williams F1

NC Tool Path Programming

Race Car Component Optimisation

Design & Development (including CAE assessment) of Articulated Gearbox Test Rig

INTERVIEW OF THE FORTNIGHT

ALEX BURNS

The chief operating officer of WilliamsF1 tells Ammar Master that the Formula 1 team is working with Tata Technologies and INCAT on some important projects.

What work are Tata Technologies and INCAT doing with WilliamsF1? F1CAT is engaged on two projects. The first is 'production engineering' of the Williams FW35 Formula 1 car. We're redesigning a complete car, every part, every detail. 100 per cent of the components will be different.

We are the design partner of this car, and INCAT is employed in this role. The other project is the 'engineering of the unknown'.

INCAT will also be doing the design, analysis of our new racing car, the FW36. We've had a very good relationship with them previously, quite high-profile.

A Formula 1 team is not big business. However, there are a lot of other areas that we're involved in, such as racing, non-racing, non-formula racing. This is related primarily with the ongoing talks at the moment, which are very interesting, involving which is a high-profile power of engineering.

What was the vehicle for checking in INCAT?

It's a combination of two very important factors: cost, INCAT and Tata Technologies have the skills we need to do this work. We want something that's very cost-effective, and we also need to have very good partners in order to do these projects. We also need to have a culture that's very compatible in terms of the relatively different way that the two organisations work.

What kind of synergies have you found working with INCAT?

We've done a lot of work with INCAT and Tata Group. Like us, they are very competitive, they have good racing experience.

Recent and on-going work produced in F1 has been, I think, working at the very highest level. We've had to do a lot more research at every single element of the vehicle, to make sure that the people we want, they want to do it, do it to the best of their ability.

Are you also exploring any other projects with INCAT?

INCAT has a very good relationship with WilliamsF1, and we are looking at opportunities for further work. The WilliamsF1 team is an affiliate, a wholly-owned subsidiary of the Williams Group. The other car manufacturers are not wholly-owned by the Williams Group.

Are we at the very beginning of the development of the WilliamsF1 team? There is a lot of complexity.

INCAT has a lot of work to do to be able to move a team of this size, and to move it to a level of operation that can be done in a cost-effective way.

All of the Formula 1 people I know, I think, would be very interested in what INCAT is doing.

WilliamsF1 has a very good relationship with INCAT, which is a very good sign.

WilliamsF1 is a very good, very competitive team, and I think that's great. What is a competitive industry is the best, and we're very competitive. We have our work to do, and I expect a very good relationship.

In F1 there's a 'winning opportunity' for Tata Technologies and INCAT. From this interview?

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It's clear that these will be very important partners for WilliamsF1, and for this Formula 1 team. This will be very important for the WilliamsF1 team, and for the Williams Group.

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What's a commonality in the culture and approach of both INCAT and Tata Group?

There is a lot of very good work being done by INCAT.

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What work are Tata Technologies and INCAT doing for WilliamsF1?

INCAT is engaged on two projects. The first is production engineering of some elements of the 2007 race car.

We redesign a complete car every year where about 98 percent of the components are new components. We are in the design phase of that car.

Is there also a learning opportunity for Tata Technologies and INCAT from this experience?

We do place great emphasis on doing things very quickly to very high standards. So I hope that there will be some benefits for Tata Technologies in taking this forward. But there will also be technology coming the other way in the longer term. We will get to a point where Tata Technologies is designing complete parts of the car and it is making improvements to the design. So rather than production-engineer a part, they take a part that we currently manufacture, study it and come up with ways to improve that part. We are very open to this as well. We are some months from starting this but it will be the next phase of work.

AUTOCAR
PROFESSIONAL

What was the criteria for choosing INCAT?

It was a combination of two key items – expertise and cost. INCAT and Tata Technologies have the skills we need to do this work. We work very much at the very high end of engineering, so we need to have very good people to work

"We share a similar culture, attitude and approach with both INCAT and Tata Group. Like us, they are very competitive."

Case Studies – North American OEM

Client

- ê North American OEM
- ê Advanced Vehicle Group and Design Studio

The Problem

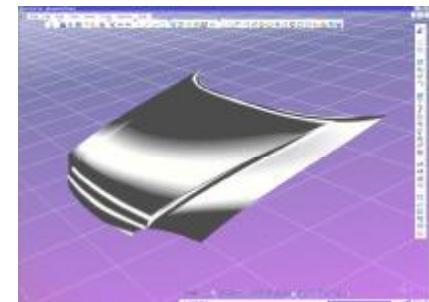
- ê Insufficient resources to execute the exterior surface
- ê Development for a range of full-size pickup trucks
- ê Client under significant cost- and time-saving pressures

INCAT approach:

- ê Onsite/offsite program management and client interface
- ê Offsite and offshore design execution
- ê Advanced usage of CATIA® V5 methods and capability
- ê “Overnight” capability

Value to Client:

- ê Demonstrated E&D capability in a local and offshore secure environment
- ê **32%** project cost savings vs. conventional delivery model



Case Studies – Specialty Vehicle Manufacturer

Client

- North American specialty vehicle manufacturer

The Problem

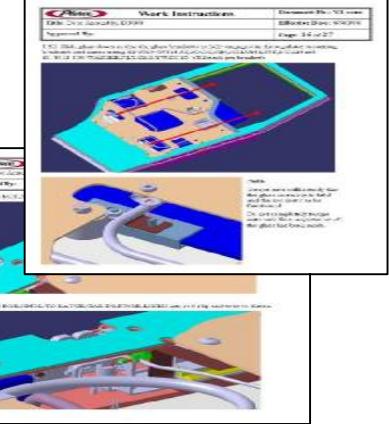
- Insufficient engineering resources to execute new product delivery schedule – 20 door designs incl. FEA and all CAD files integrated into Client Data Systems
- Client under pressure by market demand, needed to meet aggressive timeline and cost-saving targets

INCAT approach

- Integrated onsite program management
- Offsite and offshore engineering and design execution
- Full leveraging of “round-the-clock” execution capability

Value to client

- **43%** project cost savings vs. conventional delivery model
- Reductions in components (-45%), mass (-20%), manufacturing time (-52%)
- Aesthetic and ergonomic improvements over current product
- Shared engineering patents between INCAT and client



Case Studies – Tata Motors

Client

- ê Tata Motors – Commercial Platform, Pune, India

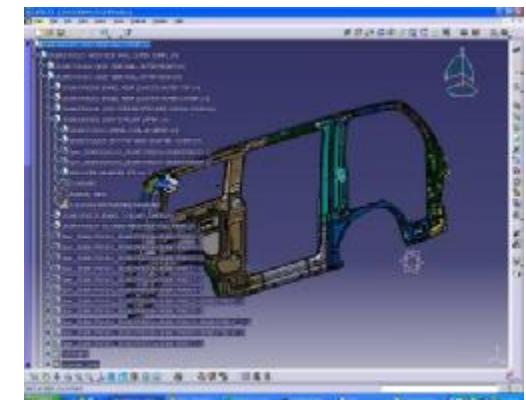


The Problem

- ê Insufficient resources to execute major facelift in BIW within allocated timeframe, utilizing common panels / structure, Integration of Eng'g teams and CAD data to be seamless to the client

INCAT approach

- ê Onsite and offsite delivery team, working hand-in-hand with customer team in BIW development
- ê Supplier part development parallel with BIW design activity
- ê Quality checks performed by INCAT and data released directly in customer native PLM system - TCe



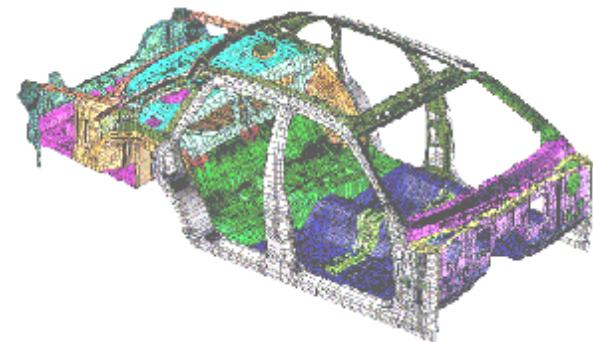
Value to Client:

- ê Core BIW design from concept through manufacturing
- ê Design for manufacturability and design for assembly
- ê advanced usage of CATIA V5 methods and capability

Case Studies – North American OEM

Client

- ê North American OEM
- ê CAE Group - all vehicle engineering platforms



The Problem

- ê Insufficient resources to execute CAE needs demanded by an increasing future product pipeline
- ê Client under significant cost saving pressures

INCAT approach

- ê Fully-integrated onsite program management and customer liaison
- ê Offshore analysis execution and design improvement recommendations
- ê Full leveraging of “round-the-clock” execution capability
- ê Leveraging of other Tata Group companies’ capabilities

Value to Client

- ê **50%** cost savings vs. conventional staffing augmentation model
- ê Conformity to common standards and processes across platform increased

Globalization of Innovation

- § **Automotive and aerospace industries are moving from outsourcing to globalizing innovation**
- § **Globalizing innovation is different than IT (ITO) or Business Process Outsourcing (BPO)**
- § **Access to qualified personnel is a key driver to globalizing innovation**



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A TATA TECHNOLOGIES COMPANY
MAKE IT REAL