industri DESIGN

Eicher 2020+

Michael Pye
Philip Allison

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Tutor: Lars Eriksson

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Abstract

Investigating the Indian society, culture and truck market to develop a list of criteria (design brief) for an optimal truck for these markets. These criteria will be used as a starting point for the design process of designing the truck.

Investigations in Sweden (at Volvo) and in India (at Eicher).

Research conducted through design methods and interviews with stakeholders.

It is the goal of this thesis to create two examples of what a domestically built truck for the Indian market could be.
Summary

This thesis has been written to document the research and the concept development of 2 trucks for Eicher commercial vehicles India. Eicher is a 50:50 joint venture partner with ABVolvo, the Gothenburg truck manufacturer. This report documents the initial research completed in Sweden into the Indian truck market, the justification for the project and the observations gained from a research trip to India.

The second half of the project documents the development process and final individual concepts developed by the Authors.

The research can be divided into 4 sections:

- The reasons why India needs its own unique type of trucks and the justification for Volvo to provide such a truck through Eicher. Namely the increased business the growing country can provide to Volvo.
- The report identifies the stakeholders involved and affected by the Indian freight Industry
- The state of the Indian freight market
- The future predictions for the Indian economy and the freight Industry

The concept development process is elaborated on with respect to the design methods and theories used and the combined group design process. The report then splits in to 2 sections where both authors explain their individual processes. 2 truck concepts were developed to show 2 examples of the feeling and functionally what sort of truck is needed on the Indian sub-continent. The exterior was focused on and the resulting truck is presented through renderings of Alias surface modelling software models and through pictures of 1:10 scale models made for the thesis partner company ABVolvo.

By far the largest section of the report is in the appendix and that is the observation section. This section documents all the firsthand knowledge learnt in India about the Indian trucking industry. This section is arguably the most important section of the thesis as it fore fills the major question this thesis attempts to shed light on. The major questions of this thesis being, what is the Indian trucking like? How is it changing? And what does it need?

The authors of this thesis Phil and Michael hope you find what you read informative!
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1 Introduction

The introduction of this report covers the project description, research and background.

1.1 Project description / research question

This project was created to look into concepts for domestically built trucks for the Indian market that could later be used as platforms for export. The research question that the thesis explores is what this truck should, conceptually, be and what values it should express in a changing India.

1.2 Background

In 2008 AB Volvo entered into an agreement with Eicher Motors to establish a joint venture, VE Commercial Vehicles Ltd in India. The company 50% controlled by Eicher and 50% controlled by Volvo was established to produce trucks for the Indian market. They will be sold under the VE Commercial Vehicles mark (Wikforss, 2008).

AB Volvo sees India as a lucrative market for the company. In keeping with the group’s strategy to purchase and develop local brands while increasing economies of scale they agreed to a partnership with Eicher to build trucks in India suited to the India market.

“AB Volvo utilises common architecture and shared technology to create synergies and reduce costs (Annual Report Volvo Group, 2010, p11).”

“By selling products with different brands, the Volvo Group can penetrate many different customer and market segments in mature markets as well as growth markets (Annual Report Volvo Group, 2010, p16).”

Extensive research into the Indian market is important as shown in the following quote. “The literature is rich with examples of multinational firms that failed year after year, before they finally understood the preferences of Indian consumers. Coca-cola initially failed because the brand was too American; Kelloggs failed because Indian consumers would not eat cold cereals for breakfast; early launches of microwave ovens as a product failed because they did not fit into the Indian way of cooking (Prasso, 2008).”

As a result it is important to know and understand the Indian market. This is achieved through an in depth study of literature as well as a trip to India. From the findings 2 concept models will be developed with the needs of the Indian market in mind.
It can be inferred that Volvo see the Indian market as very lucrative future market for the company. The European market of late has not been as lucrative as it may have been in the past. Industry magazine “FleetOwner” has reported “Scania is cutting its production rates back a further 15% and plans to lay off some 1,000 workers as it said demand for heavy vehicles continues to decline in Europe, Latin America, and elsewhere (Kilcarr, 2011).”

In another article FleetOwner quote analysis that “Demand appears healthier in developing markets such as Brazil, China, and India, although demand in Russia has been very weak of late, Standard & Poor's reported (FleetOwner, 2010).”

In recent times cooperation’s and joint ventures between Western countries and Indian and Chinese manufacturers has become more and more common due to weak growth in Europe. In this high competition market it is increasingly important to profile design in the early stages of truck development. To do this correctly a thorough understanding of the cultures of use and the segments of market is needed before design can commence.

To this end this project is started and carried out in two phases; research to obtain the brief and then design to realise it.

1.3 Objectives

The main objective of this report is to get to grips with the Indian truck market for domestically built vehicles and to create concepts for this market.

In order to do this it is imperative to have an understanding of the road infrastructure, future plans, truck industry and usage of vehicles. A trip to India will allow for direct contact with the culture and allow interviews with affected users.

Post-research a concept development will be undertaken. The concepts are to show the overall emotion and design values that are needed in a future truck platform for Eicher.

1.4 Delimitations

The interior will not be looked into as this in itself would be a thesis-worthy project. If the interior is to be understandable to peoples of several nationalities and work on an export market it needs to cater to many diverse needs.

Besides some points pertinent to the exterior, the interior will not be discussed. Engine platform and chassis are to be developed by AB Volvo and Eicher and not discussed in this report, unless as circumstantial to interviews.
1.5 Ethics

The oxford English dictionary defines ethics as "Moral principles that control or influence a person's behaviour (Oxford English Dictionary, 2007)". In the field of research and data collection ethics are of a high importance as they form a base of honesty around the entire work.

Thomas W. Watson of the Armstrong Laboratory explains these principals thusly:

“The ethical principles which guide data gathering are rooted in two inalienable human rights: free speech and privacy. Survey and interview participants have the right to: 1) speak freely, without constraint, even if others may not like what they say, and 2) remain silent, or if they speak, to set limits on the personal information they divulge, and have what they say as individuals remain confidential (unless they consent to disclosure) (Watson, 1997).”

As such, all interviewees and participants in interviews or studies in this thesis were aware of its intentions and status and gave their consent to be quoted, in part or in full, by name or anonymously, herein and hereafter.

1.6 Organisation of project

This thesis is a group-work carried out by Philip Allison and Michael Pye of the School of Engineering at Jönköping University (JTH). Research, methods and analysis are carried out in tandem as is the design process. Both authors end this thesis with a finished truck concept that can be seen as an example of what a domestically built, Indian truck could be.

1.7 Project justification

Excerpt from our thesis proposal to Volvo AB (see Attachments).

“The western world is not where the money is anymore. The transportation market in the west is highly competitive & has many players, all factors favoring the move into new global markets.

There is potential for the ‘BRIC’ nations (Brazil, Russia, India & China) to provide future prosperity for AB Volvo. These economies are growing very quickly and their need for transport is insatiable. Volvo group now has a 50:50 partnership with Eicher, how can this partnership help the future prosperity of both companies?”

AB Volvo has a policy of having different brands suited to different markets. “By selling products with different brands, the Volvo Group can penetrate many different customer and market segments in mature markets as well as growth markets (Annual Report Volvo Group, 2010, p16).”

This calls for a newly developed truck suited to the Indian market. This policy is supported by research which shows that off the shelf products from other markets do not necessarily find success in India.
“Long term success in India requires firms to acquire a whole new set of abilities and set up new organisational structures that will foster continuous generations of innovative products that are tailored to the needs of the Indian consumers and industrial buyers (Coleman, 2005).”

“Winning in the Indian market will take more than just tweaking successful products and services of developed economies and selling them at a lower price to Indian consumers. Instead, gaining market acceptance requires, first, deep understanding of the local needs and all the factors that influence consumer preferences, and then designing products that are customized to local habits and conditions. Setting up local market research or R&D centers has therefore often proved to be a successful strategic decision in order to provide a product or service that truly responds to the market needs (Pfeiffer et al., 2007).”

By researching the Indian market both from Sweden and by visiting the country the project team aims to gather enough information & “tacit knowledge” to develop 2 truck concepts suited to the subcontinent. The intention is for the concepts to act as a guide to what features, functions and aesthetics are suited to India, in order to help Volvo designers in their future Indian product development.

Why India? The benefit of focusing on the Indian market is its size and future potential.

“India continues to grow at a rapid pace, although the government recently reduced its annual GDP growth projection from 9% to 8% for the current fiscal year ending March 2012 (South Asia Regional Office World Bank, 2005).”

The volume of freight in BTKM (Billion Tonne kilometres) carried by road grew annually at an average rate of 6.5% as compared to 3.6% for railway freight during the last 10 years (South Asia Regional Office World Bank, 2005, p305).

Future projections for India show a huge increase in vehicles on Indian roads. The graph below shows commercial vehicles (CV’s) increasing from around 6 million vehicles in 2010 to 19-22 million one decade into the future.
The impression that India can be a long and prosperous new market for European companies is shared by others.

"The market in India is new. We expect a steady growth of 10-20% over the next few years," This is a quote from Yves Fargues, Chairman and Chief Executive Officer, GEFCO the logistics arm of the PSA – Peugeot Citroen group, form an article in the Indian Economic Times. The same article then stated that GEFCO plans to add a further 100 trucks to its Indian fleet in the next 12months (Desai, 2011).

Finally and perhaps most obviously the population of the whole of Europe according to the United Nations website is 738 million people and in 2011 had a growth rate of 1.6% (Eurostat, 2012); whilst the total population of India is 1.225 billion people living in a country with only 8% growth (UN World Population Revision, 2010).
2 Theoretical Background

In this section, the theoretical background necessary to understand the thesis is presented. In sub chapter 3.3 Truck market analysis the focus was on the Indian truck market to provide the author and the reader the necessary background to understand what is happening today in India to make accurate inferences into what may happen tomorrow.

2.1 Stakeholders

The term stakeholder is accepted in this report as to mean “any group or individual who can affect or is affected by the achievement of the organisation’s objectives (Freeman, 1984).” Freeman’s definition is originally used in a business sense, yet it is possible to replace “organisation” in the above quote with any noun required for the field of use (individual, product, and so on). In the case of this project, the following are deemed stakeholders in that they affect or are affected by the design (in some cases, the mere existence of) of a heavy goods vehicle. They are divided into people and entities and a description is given as to their function in the context of this thesis.

2.1.1 People, in no particular order

Here is a quick list of effected people in the trucking industry, they are presented in no particular order and explained briefly.

2.1.2 Border crossing guards and personnel

India is comprised of 28 states (National Portal of India, 2012) and at each of these state borders a crossing fee or tax is charged (South Asia Regional Office World Bank, 2005) the bureaucracy and paperwork at these stops greatly cripple the truck networks effectiveness and, through “facilitation payments” and the like; its’ profitability.

2.1.3 Fellow road users (powered and non-powered)

The roads in India are extremely congested, with road users varying from fellow heavy-goods vehicles to bicycles to pedestrians to cows (South Asia Regional Office World Bank, 2005).

2.1.4 Truck-stop personnel

There are many truck stops along the way and many serve as overnight points for drivers or simply as places to eat (South Asia Regional Office World Bank, 2005).
2.1.5 Work brokers

Most truck work is handled by brokers acting as middle-men. They ensure the quality of the contracted driver to the company and they ensure contracts for the truck fleets. Most drivers are contracted on a one-time, single direction basis (South Asia Regional Office World Bank, 2005).

2.1.6 Fleet owners

For the purpose of this report it is important to differentiate between the owners of fleets versus the owners of single trucks. In this project a fleet is seen as comprising of more than 5 Trucks.

2.1.7 Private and very small fleet owners

For the purpose of this report it is important to differentiate between the owners of fleets versus the owners of single trucks. In this project a private owner is seen as comprising of less than 5 Trucks.

2.1.8 Maintenance/repair personnel

While on a long distance drive, it is common that there will be a two-man driver team and a helper. In the event of an accident or mishap it is these three that need to fix the vehicle (see Observations). Fleet mechanics would be at the base unless they could be shipped out to the incident.

2.1.9 Truck drivers

There are approximately 5 million (2008 figure) truck drivers in India, travelling a 66,000km highway network. The most common employment (77%) is through small fleets (5 or fewer vehicles); specific contracts are handled through brokers (Avahan, 2008). The use of brokers and the norm of a one-direction contract makes the work inherently unstable and working conditions unsure (South Asia Regional Office World Bank, 2005).

2.1.10 Entities, in no particular order

2.1.10.1 Volvo

Volvo Group is a group of brands manufacturing a range of commercial vehicles including trucks, buses, construction equipment, engines and drive systems for boats and industrial applications, as well as aircraft engine components. For the purposes of this report only the truck business will be focused on (Volvo Group Global, 2012a).
Truck operations account for almost two-thirds of the Group’s total turnover and are organized such that

- all product development is gathered together in **Volvo Group Trucks Technology**,
- all production is grouped separately in **Volvo Group Trucks Operations**,
- all sales operations are divided into distinct geographic regions
  - **Americas** (North and South America),
  - **EMEA** (Europe, Middle East and Africa) and
  - **APAC** (Asia and Pacific).

(Volvo Group Global, 2012b)

The trucks are sold and marketed under the brands **Volvo**, **Renault**, **UD**, **Mack** and **Eicher**, which all offer customers a broad range of products and services for efficient and economic transports (Volvo Group Global, 2012c).

The Group utilizes common architecture and shared technology to create synergies and reduce costs. By selling products with different brands, the Volvo Group can penetrate many different customer and market segments in mature markets as well as growth markets (Annual Report Volvo Group, 2010, p11-16).

### 2.1.10.2 Eicher

Excerpt taken from observations with Anil Badpaj of Eicher’s Product Planning Department, and verified from the interactive timeline on the Eicher website (Eicher Trucks and Buses, 2012).

Eicher which is located near Indore in Pithampur was set up 60 years ago as ‘GoodEarth’ making tractors. In 1986 the company started building trucks in partnership with Mitsubishi with the first truck rolling off the line in 1989. In 2004 Eicher sold their tractor business along with the rights to brand tractors ‘Eicher’. 2008 saw a JV (joint venture) between Volvo and Eicher begin. Recently the company released an update of their trucks, the ‘E2’ series truck which is a very basic update. The company first started building low and medium duty trucks and have since expanded into heavy vehicles. The company have done well in the medium duty vehicle market winning 31% market share. Due to Eicher being a relative newcomer to the HCV market they only comprise of 1% of total market share. The big players Tata and Ashok Leyland dominate the market.

**The company has a truck in every category** from LCV to HCV in is very proud of that. The Indian truck market is driven by one thing, maximising value for money. Eicher try to adapt to this and market their trucks on value for money.

**Mileage ka badshah** translates to “king of fuel economy”
2.1.10.3 Joint-venture objectives

VE – Volvo Eicher Commercial Vehicles is a 50:50 joint venture between the Volvo Group (Volvo) and Eicher Motors Limited (EML) (VE Commercial Vehicles, 2012). The intent of the company is to manufacture and sell modern commercial vehicles in India and then other developing markets (VE Commercial Vehicles, 2012). Currently the company manufactures a range of GVM 5 – 11 ton trucks, based on licensed Mitsubishi technology (Eicher Trucks and Buses, 2012). Eicher’s product range comprises light, medium-heavy and heavy-duty trucks and buses in the weight classes 5–40 tons and complete bus chassis in the 5–15 ton range. The company has an extensive dealer and service network principally located in India (Annual Report Volvo Group, 2010, p31). In 2010, the total market for medium-duty trucks (7–16 tons) rose by 50% in India while deliveries of Eicher trucks in the medium-duty segment increased by 51% (Annual Report Volvo Group, 2010, p31). The company manufacturers trucks in India at it’s Pithampur plant which has a capacity of 20000 vehicles per annum (Eicher Trucks and Buses, 2012).

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light trucks (under 7 tons)</td>
<td>1,113</td>
<td>2,014</td>
</tr>
<tr>
<td>Medium trucks (7–16 tons)</td>
<td>7,889</td>
<td>11,940</td>
</tr>
<tr>
<td>Heavy trucks (over 16 tons)</td>
<td>1,174</td>
<td>2,406</td>
</tr>
<tr>
<td>Total</td>
<td>10,175</td>
<td>16,359</td>
</tr>
</tbody>
</table>

1 The joint venture together with Eicher Motor Limited is to 50% consolidated into the Volvo Group. The deliveries in the table pertain to the Volvo Group’s share of Eicher’s deliveries.

2.1.10.4 Factory builders/process workers

Factories are getting more and more automated and are using large machines to do what was labour intensive operations. Despite these modernisations, there is still a lot of man-power being used in factories today, not least in tool design and CNC programming. This being said, it was seen that the factories in India rely to a huge degree on manual labour. [see Observations]

2.1.10.5 Company managers and economy

Value for money is often the final word in a purchasing situation. Number and type of truck bought is based on a need and is governed by specific economies, legislation and feasibility (see Observations).

2.1.10.6 Shipping enterprises

Shipping enterprises use truck fleets for the distribution of goods across the country. They rely on timely pick up, good road speed and safe delivery.
2.1.10.7 **Purchasers**

Those at a company who decide the truck to be purchased or the owner of a small fleet / one-man business.

2.1.10.8 **Foreign investors**

Such as Volvo in VE HGV or Mercedes-Benz in Bahrahtbenz. Their interests are at stake along with reputation and, of course, money.

2.1.10.9 **Local culture, customs, art**

There is a fine tradition of painting trucks in India. Decoration ranges from garlands to icons to full paint jobs, religious passages.

2.1.10.10 **The environment/mother nature**

The environment is of course always an issue with vehicles. Trucks are not known for their aerodynamic properties and in a world where fossil fuels are up for debate, economy and consumption are two big design topics.

2.1.10.11 **Competitors**

As can be seen in figure 2 the market in India is dominated by Tata Motors LTD, with Eicher holding a relatively small footing in the >7.5t market. Other competitors include Mahindra.

2.1.10.12 **Regulations and legislation**

Yes there are rules similar to those in Europe, but perhaps a few years behind in implementation, however enforcement is lax and bribes are common [see Observations].

2.1.11 **Hierarchy of stake**

As famously recorded by George Orwell, all animals are created equal, but some are more equal than others. This is also true of stakeholders. Some of the above have direct impact on the design, some do not. Conversely, some are directly impacted by the design whereas others are not.

Stakeholders are here ranked using an impact(power)/interest map such as the one by Newcombe (2003):
Figure 2 - Hierarchy of stakeholders

Interest/influence matrix, authors own graph, the amount of time spent on each stakeholder was in relation to their importance and interest. It was correctly assumed that the driver and owner would be the most important stakeholders so they were the major focus.

Placement on this graph is based on the stakeholders’ interest and impact in the design of the vehicle. It can be seen that the people who could be seen as the main stakeholder, the driver, has in fact little influence over the overall design of the vehicle, baring perhaps exterior paint and modifications. Conversely, it is things like legislation and regulation or the economy of the company that have much to say but little interest or stake in the design, bar perhaps as advertising.

Placement on this graph represents a general picture of stake. In some cases individuals may be more or less interested in the design of a truck, depending on their personal interests and backgrounds.

2.2 Stakeholder ethics

In the case of other road users, truck drivers, and mother nature there is a conflict of interest. These stakeholders are most effected by the truck itself yet have often very little to say in the overall design of the vehicle. Technology exists to aid these holders, be it ergonomic seats, hi-visibility headlights or low-emission engines. The question is rather one of selling point, market share and
who pays the bills. It is the lament of the designer that the people whom the product is designed for are not the same as the purchasers, and these have distinct and different priorities when procuring vehicles.

Any design should cater to the needs of the stakeholders. It may be that certain features that are not central to procurement specifications are of most importance to the driver (for example). Positions on the graph are decided from the research carries out and the observations from India.

2.3 Truck market analysis segments (premium affordable etc)

In 2009 truck sales suffered a blow due to the global financial crisis that was ruling at the time. These caused sales to drop by half from a comparatively strong 2008 were 420,000 trucks sold in India. The Indian truck market is big and diverse and it can be split into either ownership type or weight class for a simpler overview. The following is a breakdown based on ownership.

- Joint Ventures (JV)
  Partnerships with two or more companies, examples include the Volvo Eicher JV (VEHGV)

- Domestic Original Equipment Manufacturer (OEM)
  Such as Tata, Mahindra

- Foreign Original Equipment Manufacturer
  Such as AB Volvo, Mercedes Benz

These different forms of company are competing against each other at very different pricing points, as can be seen in the following graph taken from a report from the Roland Berger research company (Dressler & Gleisberg, 2009).
With regards to weight classes, the following graph depicts the segment of the market with trucks greater than 7.5t in weight (figures from 2008).

The two fastest growing players in the truck market are Tata and Ashok Leyland, with 64% and 25% market share respectively. Figures from the Roland Berger Strategy Consultants projection report state that Eicher had a 6% share of the overall market (2008), compared to the 9% share of this specific market (Dressler & Gleisberg, 2009).
The graph shown above, from the society of Indian Automobile manufacturers shows sales figures from 2004 to 2011 and shows a palpable growth (Siam India, 2012).

2.3.1 Road transport industry

The transport industry is extremely deregulated with many middle men. General logistics centred on single owners and a few large fleets. The ratio is changing, fleet proportion of market is increasing. There is a growing trend for large logistics companies to build a foothold in India in recent years [see Observations].

Larger fleets tend to get focus on contract work and specialised transport, i.e. petroleum or regular schedule route transport, fleet based or high profit industries such as mining. This leaves the rest of the work to smaller fleets which complete the single journey contracts and do all the work which makes the Indian day-to-day economy tick over (see Observations) (South Asia Regional Office World Bank, 2005).

![Figure 5 - Society of Indian Automobile Manufacturers - Automobile domestic Sales Trends](image)

![Figure 6 - Competition Issues in the Road Goods Transport Industry in India with special reference to The Mumbai Metropolitan Region](image)
This graph is indicative of the way Owner drivers or small fleet drivers receive work from middle men. The trucks are set up to be as flexible as possible for more work in order to win one way contracts. After the contract is for filled drivers must find return work to get home.

Road infrastructure: Profitability is severely affected by the road system. Dangerous, poorly maintained and congested roads abound. Trucks contribute to the problem as they are underpowered, overweight and poorly maintained. Smaller trucks less than 10t which are common in India are legally able to load their trucks above the specified axle weight the roads are designed for. Trucks are also frequently overloaded to increase profitability resulting in further damage to roads. [see observations and world bank report]

Profitability: Road speed, irregular work, breakdowns, ”facilitation payments” state borders and especially diesel prices effect profitability.

Truck use: The majority of trucks are owned by small fleets or private individuals. Thus the fleets are very flexible as they need to ensure the highest possible truck utilisation in a highly competitive market. The quote “Anything but bombs” from a talkative truck driver in Chennai confirmed this [see Observations].

2.4 Market projection

Future predictions based on the literature review. In the comments section of the report there is a comparison of these predictions and the predictions based on observations.

2.4.1 Future predictions for the trucking industry in India based on the literature reviewed

India is racing to catch up with the west and in that quest it must improve its ability to transport freight. Currently the Indian freight industry is made up of mostly small to medium sized trucks run singly or in small fleets of less than 5-6 trucks. There are no proper logistics systems in India, trucks are generally hired for single runs, not long term contracts. The road infrastructure in India at present is substandard and there exist many road blocks to efficient transportation of goods, such as inefficient and corrupt state border crossings. The India of the future however has a more rosy and somewhat western outlook. There is an ambition to improve everything, however the amount of time needed to do this is unknown. Decisions are slow to be made, bureaucracy is inefficient and the amount of people involved large.

For example during the course of this project research has included analysis of publications from Indian government ministries associated with roads. The ministries associated with the roads include:

- Ministry of Heavy Industries and Public Enterprises
- Ministry of Planning
- Secretariat for Infrastructure
• Ministry of Road Transport and Highways
• Indian Planning Commission
• National Highways Authority of India

Add to that the various state government bodies and it is easy to understand why progress is slow.

Probable changes for the Indian freight Industry: It is felt that there will be larger more fuel efficient vehicles on the road and more of them as road freight does proportionally more work than the railways. In the future it is likely that more trucks will be sold to fleets and fleets will grow larger. India is growing very quickly and there is every likelihood that the roads will stay congested as the government struggles to build enough roads. The demand for new trucks should also increase as access to credit is becoming easier, the country’s GDP is growing strongly and new emissions laws forbid trucks older than 15 years old operating in the cities.

2.4.2 Corroborating evidence

Facts found today which supports the authors future predictions.

2.4.2.1 Emissions standards:
India is continually increasing them. Across the country in 2010 Bharat stage 4 emissions came into effect. Indian emissions standards are modelled on the Euro standard but come into effect approximately 5 years after their Euro equivalent.

![Graph showing comparison of Indian emission standards to the west.](image)

Figure 7 - Graph showing comparison of Indian emission standards to the west.

This is having an effect on older trucks on the market as the Indian government is bringing in legislation to encourage truck owners to upgrade to newer trucks.
In Kolkata trucks 15 years or older will not be permitted to operate (ET Bureau, 2009).

2.4.2.2 World bank report:
In its 2005 report on Road transport in India the world bank had a number of suggestions. The three major issues the paper identified for the Indian trucking industry were: poor roads, checkpoint delays and corruption, and small heavily laden trucks. The paper was adamant that for India to increase efficiency and effectiveness in the trucking industry larger tractor-trailer units must be used, the roads must get better and corruption and inefficient government must be curtailed.

2.4.2.3 Automotive: Market & Opportunities June 25, 2008 (IBEF, 2008)
- Commercial vehicle industry increased 26% from 2002 to 2007. There is no reason to see this growth abating.
- Multi axle sales are increasing 2006-07 21% of the market. 8% 2001-02.
- Main factor for buying a truck is Economies of operation. Industry characterized by low proportion of owner drivers. Criteria like driver comfort & safety trivial.
- Eicher motors 6% of market. Tata 64%, Ashok Leyland 16%
- Indian economy average growth recent years 8.5% recent years. Manufacturing sector growing 8-10% in recent years. More and more demand for gods transportation.
- >90% Commercial vehicle purchases on credit. Financing access increasing.
- Roads taking over from railways, new preferred transport method.
- Overloading enforcement increasing
- Some states curbing use of old CV’s.

<table>
<thead>
<tr>
<th>Description (by Gross Vehicle Weight)</th>
<th>Share in 2001-02</th>
<th>Share in 2006-07</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 3.5 tonnes (Pickups)</td>
<td>15%</td>
<td>36%</td>
<td>51.9%</td>
</tr>
<tr>
<td>5 - 7.5 tonnes (LCV)</td>
<td>25%</td>
<td>9%</td>
<td>5.1%</td>
</tr>
<tr>
<td>7.5 – 12 tonnes (Intermediate CV)</td>
<td>7%</td>
<td>9%</td>
<td>33.4%</td>
</tr>
<tr>
<td>12 – 16 tonnes(4K2 FF/SF)</td>
<td>29%</td>
<td>17%</td>
<td>14.6%</td>
</tr>
<tr>
<td>16 – 25 tonnes (Multi Axles)</td>
<td>8%</td>
<td>21%</td>
<td>55.9%</td>
</tr>
<tr>
<td>25 tonnes and above (Tractor Trailers)</td>
<td>8%</td>
<td>21%</td>
<td>9.7%</td>
</tr>
</tbody>
</table>

Figure 8 - Segment analysis of the Indian CV market (CAGR = Compound annual growth rate) (Siam India, 2012)

2.4.2.4 Truck Industry 2020 (Dressler & Gleisberg, 2009)
- More and more global partnerships.
- 100% local part sourcing, 1/3 cheaper truck price.
• Trucks upgrading, more professional, environmental, big trucks are becoming more common, truck companies consolidating efforts, there will be less of them in 2020.

2.4.2.5 The role of the Indian government and its ministries/departments

Larger trucks (DHI, 2011)

The Indian department of heavy industries is in favor of multi axle vehicles. “9.3.3 The Government will promote the use of multi-axle vehicles for carriage of goods as they cause reduced environmental pollution and lesser wear and tear on road surface in comparison to the existing 2-axle trucks (DHI, 2011).”

2.4.2.6 Improved road infrastructure:

The Indian government is aware and is focused on upgrading India’s road infrastructure which will allow the use of different types of trucks including larger multi axle types. “10.1 Traffic on roads is growing at a rate of 7 to 10% per annum while the vehicle population growth for the past few years is of the order of 12% per annum. Poor road infrastructure and traffic congestion can be a bottleneck in the growth of vehicle industry. A balanced and coordinated approach will be undertaken for proper maintenance, upgradation and development of roads by encouraging private sector participation besides public investment and incorporating latest technologies and management practices to take care of increase in vehicular traffic (DHI, 2011).”

2.4.2.7 Road projects and more specifically the Golden quadrilateral:

Indicative of the new road networks and economic development. The Golden Quadrilateral is a road project to link the 4 major cities of India; Delhi, Kolkata, Mumbai and Chennai with high speed and high capacity expressway. Work was officially completed on Sat Jan 07 2012 (ENS Economic Bureau, 2012).
According to the Secretariat for Infrastructure there are many plans for Indian roads in the future. The government believe there will be "Annual growth projected at 12-15% for passenger traffic, and 15-18% for cargo traffic." & "Road development is recognised as essential to sustain India's economic growth (India Infrastructure, 2012)."

There is a clear need for more trucks to be produced, however the type of truck produced is important too. This report suggests that larger trucks with multi axels will take on a larger role in India and part of the story can be explained by statistics from the Secretariat. Similar views are shared in the Automotive Mission Plan 2006-16 (DHI, 2006).

After firstly noting the incredible growth of the Indian Automotive Industry, the need to promote the local Industry due to its potential and potential to grow the Indian economy as quoted below the paper points to the direction of the market the future the ministry is planning for & its preference for road over rail freight (DHI, 2006).
Past
“The Indian Automotive Industry after de-licensing in July, 1991 has grown at a spectacular rate on an average of 17% for last few years.”
“Local availability of almost all the raw materials at a competitive cost has emerged as one of the favorite investment destinations for the automotive manufacturers.”
“The Automotive Mission Plan (AMP) 2006-2016 aims at doubling the contribution of automotive sector in GDP by taking the turnover to 145 USD in 2016 (DHI, 2006)”.

Future
“In the commercial vehicle segment, increased investment in road infrastructure and availability of cheaper finance has led to a growth in multi-axle vehicles.”

“Ensuring need for quality road network and maintenance of existing roads including a special emphasis on design for safety.”

“Ensuring last mile connectivity between ports and auto hubs”

“Better connectivity and streamlining procedures for border trade”
“Industry has demanded that old vehicles of more than 15 years of age could be retired by providing certain incentives and concessions for replacement through a single-window programme for modernisation of vehicle fleet. The primary objective is to reduce pollution by accelerating normal fleet turnover so that new, cleaner vehicles can be put into use sooner than would occur in the normal course. Industry and government together will address this issue (DHI, 2006)”.

2.4.2.8  Current automobile market
Is is possible to look at the currnt automobile market in India and see some common traits; Simplicity, size, functionality, cost. The best selling cars in India are basic, they are built to do a job and to do that job effectively for the lowest possible price. The technology used is simple and proven. Expected features in a european car are at best an option, aesthetics take second place to functionality as do safety to price, performance to economy and technology to economics and reliability.
Trucks take this philosophy to another level. They are a business tool: a tool to make money. The highly competitive trucking industry ensures there is no room for waste and the trucks reflect this.
Any truck must reflect the philosophies of the truck drive; Efficiency, reliability, cost effectiveness, and maintainablility.
Certain features have become standard through dint of longevity and easy of use. Generally the back needs to be open so the largest amount of product can be fit into the back. The roof of the truck if it is not used for more freight or is filled with tools needed for running the truck, the most obvious product being Tarpaulin to cover the load.

These trucks show what's happening today, one of the aim of this thesis is to take this to tomorrow.

Figure 10 - Examples of commonly used trucks in India
2.5 Local production methods

With the ambition of making a domestically produced truck in and for India, and eventually for export, it is important to know what sort of industry, materials and methods are available locally.

2.6 Use of vehicles

There has been great success in recent years for the trucking industry. This is because of a number of factors, but an article from maps of India highlights a few important ones, namely ones of convenience and connectivity. With truck it is possible to carry small loads through terrain that a train could not handle, or where an aeroplane could not land. Thus the use of trucks for haulage and delivery is obvious, and in quarries and mines also.

The Indian trucking business has been incredibly successful. Compared to the railroad system, trucks can reach rural and hilly areas and are quicker to load and un-load than trains (Business Maps of India, 2012).

2.7 Design language

Design language is the visual clues and codes used by a product or a brand to signal its usage, heritage or identity. Successful brands have an arguably cohesive design language that allows consumers to recognise the brand even without the use of logos. Examples of this can be found in the grill and shoulder of Volvo cars, or the specific red of a Ferrari.
2.7.1 Eicher

Design language of an Eicher truck, at current, is based on several features. Several features have been identified as indicative of the Eicher “style” of truck. There is a possibility that a future design must be sensitive to these hallmarks as they form a kind of DNA or heritage. This being said, the past cannot be allowed to dictate the future in a way that stifles innovation or that prohibits advancement. A heritage of flat fronts could be the result of limited production facilities. This should not dictate the future with regards to aerodynamics.

Figure 12 - Design features of the current Eicher models
2.7.1.1  Window profile.

Eicher vehicles have a rather unique window structure with the side windows dipping down to line up with a crease on the front or the windshield. This can be observed both on the trucks and on some of the busses that Eicher make.

Figure 13 - Eicher bus and 11.10 truck

Not only is this a practical feature affording the driver a greater field of vision, it is a very easy part to make a feature out of.

2.7.1.2  Black plastic

Along the nose of the vehicle is a black plastic section containing the headlights, turning signals, and grill. This instance is repeated across the truck line and has an echo in the busses as to the placement of intakes and lights. This design feature has the potential to be an iconic hallmark of the Eicher brand, much like the unmistakable grill on a Volvo car.

2.7.1.3  Creases

the side of the cab body has a crease that mimics the angles of the window. A good crease has been a long standing tool in the automotive industry to create a dynamic or memorable panel. Throughout the years, BMW have done this extremely well, with every car having a clear crease along the side as an easily recognisable feature.

2.7.1.4  Proportion

the front of the cabin is comprised of bumper, black grill, body and window. These have a progressively large percentage of size and this change in proportion is interesting.
2.8 Use of design language

After the trip to India it has been seen that the only reason for the current language of Eicher is that there has been no update in platform since the 1980s. Many of Eichers competitors are adapting a more stylish design, arguably based on European designs in many cases. If Eicher is to be seen as a modern brand then the design needs an update. In some cases it may be prudent to keep certain elements, in others it may be high time to move into the future.

Furthermore, the current Eicher line is based on a foreign platform, that of a Mitsubishi Cantor (see Observations). To differentiate the company from Mitsubishi it is prudent to design a new platform with a new design language.

2.9 Eichers brand profile

Eicher show pride in having some of the most fuel efficient trucks on the market, such as the Jumbo 15.16. In contemporary European markets this shows an environmental thinking that is very much in line with the times and fully marketable. The Eicher pride in fuel efficiency is however not out of concern with the environment but rather with the need to satisfy customer demands for a high mileage per gallon in the trucks. This particular trait is interesting as it can be marketed as either eco-friendly or cost-conscious depending on the intended market.

Eicher would like to be seen as tough, a metaphorical “little truck that could” this should be carried through into the design language (see Observations) (Eicher Trucks and Buses, 2012).
3 Method
Herein is a list of methods used in order to understand the issues and working out the necessary parts of the design brief.

3.1 Interviews
Question and answer sessions with effected stakeholders, full transcripts to be found in the appendices. Interviews were carried out with truck drivers, fleet owners, sales personnel and people working (mainly in product planning) at both Eicher and Volvo plants.

3.2 Literature review
A literature review was conducted prior the trip to India to gain an understanding of the industry; this is recounted mainly in the theoretical background section.

Observations were carried out on site of both Eicher and Volvo in India and during the entire stay in India.

3.3 Design methods

3.3.1 Creative practice
A general creative practise (so named by, amongst others, Warell) involving sketches, models, CAD work.

Sketch models made to understand the form while in a sketch phase, made intentionally rough and existing only to e.g. solve a corner or gain an understanding of a volume.

A Feedback loop with the thesis supervisors was open at all times, with Lars Ericsson at the School of Engineering and with Glen Barlow at AB Volvo in two specific workshops/meetings.

3.4 Design process
The design process can be simply described as general creative practise. Sketches are made around an idea or solution, and then these are refined. A more thorough description can be taken from the British design council and their double diamond model from 2005.
The width of the diamond illustrates how the problem is more or less “open” during the phases. Here the first diamond equates to the research phase of this project, in which research is conducted into the market, current problems. This is based on a need or problem seen in the “discover” phase. As the project becomes more defined it moves into the “brief” stage.

From this a brief is formulated containing the goals and limits, scope and reason for the project. In the second diamond the brief is translated into concepts that are refined and finally one is chosen for delivery.

A further model can be found in Roozenburg and Eekels (1995) and is illustrated in the next figure.
In this model the process starts with a function, but arguably this could be replaced with a need or problem. The most important part of this model is the loop between criteria and evaluation. In the course of this project, it is these criteria that are the main goal of the project, equitable to a design brief. From these criteria the design is formed.

Figure 15 - Roozenburg and Eekels (1995) design process
3.5 Picture game

A picture game has been made as an analysis tool. It is comprised of a set of automobiles, drinks, watches and animals. All have different traits and connotations yet are of clear groups. The idea behind the spread is that certain brands, models, types appeal to different people and by extension different people identify different attributes with different brands. The brand Audi has a certain identity and profile that people identify with and feel a certain way about, as does Swatch or even coffee. Questions around brand identity can be posed using the pictures as aids, is Eicher an Audi or a swatch etc.

Large companies and entities that wish to understand their customers have used similar tools. A somewhat inspirational tool was made in the thesis work carried out by Martin Bergman and Christoffer Wassenius in 2010 based around words. Parallels could arguably be drawn between a picture game and the collection of so called “Kansei words”.

The idea behind the tool is simple; in meeting with users, ask them to pick words or pictures that they feel answer or identify with questions posed by the designers. The results can then be used to build a collage of how the brand is perceived as seen using the iconography chosen by the users. The collage can be used then to explain the brand or product visually, to help build a brief, can be used for benchmarking purposes. Another collage can be made using images from similar sets but with different attributes showing the growth of a brands identity over time or an ideal collage; where the brand would like to find itself through the cunning use of excellently designed products.

3.6 Design compass

![Design compass](image)

Figure 16 - Design compass (Eriksson L, 2012)
Head supervisor Lars Eriksson’s own model for design has been discussed throughout the process with Lars and with researcher Martin Bergman. The design compass is a tool which ensures a holistic view of the design process by bringing the designer back to the most basic questions that ‘should’ be asked when designing a product. The design compass gives the designer a customer-focused attitude, which forces attention to the right stakeholder and ensures that needs of that stakeholder are fulfilled.

3.7 Kansei engineering

Kansei engineering is an extremely complex process which while helpful, takes years of experience to fully understand and is both costly and requires a time frame not supported in this thesis to fully implement. As a result the Authors in conjunction with supervisor Lars Ericsson, had a 2 hour workshop to define some Kansei grounded tools which can be used to evaluate designs developed from observations and to ascertain which design hits the mark according to the needs, values and tastes of the relevant stakeholders.

It is increasing obvious that the products and services that engage with users on an emotional level are the ones that succeed the best. Fields of research are being created to explore this and to aid in the making of future product. One such field is known as Kansei engineering. Kansei looks into the association between the product and the feelings it provokes through various factors, be these colour, texture or the form.

Simon Schütte (2005) amends an idea from Nagamachi by saying that “Kansei is an individual’s subjective impression from a certain artefact, environment or situation using all the senses of sight, hearing, feeling, smell, taste [and the sense of balance (annotation by Schütte)] as well as recognition (Schütte, 2005).”

Schütte’s (2005) visual model of this is illustrated below:

```
<table>
<thead>
<tr>
<th>Product Property</th>
<th>Affective Channel</th>
<th>User Sense</th>
</tr>
</thead>
<tbody>
<tr>
<td>optics</td>
<td>visual</td>
<td>sight</td>
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<td>hearing</td>
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<td>flavour</td>
<td>flavour</td>
<td>taste</td>
</tr>
<tr>
<td>Proximity of Presentation</td>
<td>Proximity of Interaction</td>
<td></td>
</tr>
</tbody>
</table>
```

Figure 17 - Kansei engineering (Schütte, 2005)

Further work has been done by many, such as Young and Warell (2008), to take this concept and flip it, in that work starts with a certain Kansei in mind.
and that is worked into a product by using the senses and channels available. In Young and Warell’s (2008) article, they present a case wherein Kansei methods have been use to create the interior of a sports car. The article is a good example of Kansei-in-action and how the evaluation tools can be used to examine a proposed design. A similar, modified approach has been utilised here, mainly to save time. In their study, large focus groups are asked to come up with and evaluate Kansei words and then to actively assess the concepts; here the words are taken from the research trip.

To achieve a luxurious Kansei, senses are stimulated using luxurious channels so that the finished product channels qualities that are picked up by the senses and trigger the sought kansei.

Warell (2004, 2008) has created a framework to support the use and implementation of Kansei engineering, called the PPE (perceptual product experience). Within this framework, product experience is centred on three nodes and illustrated their influencing factors.

Figure 18 - PPE framework (Warell 2004 & 2008)

Another useful Kansei tool used in evaluation designs is the equaliser. In this tools a word defining a feeling or a quality and its antonym are placed on a scale and elements (form, colour etc) of the design are rated along this. The Idea is not to rate the whole design be different elements on a Kansei word scale and with a new scale for each sensory element. Words used on the equaliser can be the result of a Kansei study (or similar word based study). Alternatively the tool can be used using desirables (for a future design) and can map out how certain factors can affect the outcome of a concept.

In the case of this thesis the tool was used to show what values certain elements (windows, bumpers etc.) could lie between and then concepts were evaluated along this scale. Later in the process, when the aim was clearer it was possible to mentally spot where a desirable concept would lie and to work towards it. The observations led to an understanding of what connections or feeling the finished design should inspire. This made it possible to create a set of desired Kansei or value words. The equaliser can be used to see how an element measures up to this value or how a factor can help or hinder this (Warell, 2004).
3.8 About the design process used

The process used was inherently iterative, with defining stages followed by explorative stages followed by another refining and deconstruction stage. This was to be able to explore the designs and periodically check that they did not veer far from the original brief of value words or direction. Designs would be sketched out based on the observations. These early designs would then be explored further, and then taken back to the observations and value words for evaluation. After this first loop a collection of “favorites” were chosen that were in line with the brief. These were then deconstructed in an iconography exercise in order to find prevalent themes. The results from this are a collection of important lines, a concept embodied in the most basic of expressions. The results of this exercise became the individual design languages of the designs and were then explored further and became a set of concepts. At a company meeting it was decided to go back another loop, reevaluate the concepts against the brief and redefined and concentrated value words and then explores the forms further. The outcomes of this become the final designs.

The design work undertaken in this project had two main lines. On the one hand there was traditional creative practice, iterative sketch phases that were used to explore and refine the concepts. On the other hand there is a concurrent work being done on a more emotional level, that is the value words definition and the future assumptions and observations made from the analysis of the markets and the trip. Due to the conceptual nature of the desired results, this second part is all the more important.

3.8.1 Line drawings

Simple front and side views are drawn to quickly find shapes and proportions. Drawn using simple lines and tools and without paying attention details. The truck gets broken down into its most basic parts (windows, bumper, grill etc.) By not focusing on details the main but the most recognizable lines of the truck it is possible to work quickly and create a large body of work. The results of this step can be seen as a design language, to be taken forward and the concepts to be built around.

The line drawing stage gave many pages or simple trucks. However it soon became apparent that this was maybe not the best starting point as it is quite mechanical and maybe better when the concept is more concerned with form rather than, as here, a cultural and emotional underpinning.

3.8.2 Concepts

Using the lines and shapes from the line drawing stage, trucks were drawn. These early designs were more searching in nature. In the later stages of this
step more influence was being drawn from the value words and Indian observations. This stage was about taking the basic lines and drawing many concepts quickly in order to cover as large a selection of ideas as possible. Concurrently to this the observations from India are coalesced into a number of things. Value words and a list of assumptions regarding the development of the Indian market and infrastructure.

3.8.3 Refined concepts

From the large body of sketches from the previous step a number of promising concepts were explored and refined. The large number of drawings from the previous step were boiled down to a more manageable number that would be taken forward to another stage of refinement. Selection was based on how well they meshed with the collected brief.

3.8.4 Iconography

The concepts were work shopped into submission, with the main lines being picked out for the purpose of finding a design language. This stage is similar to the line drawing stage in that details are ignored and the main lines are concentrated on. The difference being that for this step there is already a body of work to base it on.

3.8.5 Redevelop and refine concepts again

Using the design language / lines from the previous step more concepts were created. The most successful features from the concepts were taken and combined into a new design direction. Variations on the theme were created to provide explore the design. Phil focused on a designed he named ‘the line’, Michael focused on a design which focused on a grill and built the truck around and back from it.

3.8.6 Concept gate meetings with external supervisors

The refined concepts were presented to supervisors Glen Barlow and Lars Eriksson at what could be called a concept gate meeting. At this meeting the process was explained and results presented. The value words were work-shopped down to a more manageable number. It was also thought that the concepts were more form and feature focused than emotion focused. It was suggested to have another exploration phase and get “back to India”

3.8.7 Exploration

After the first concept gate meeting the concepts were refined and explored. This involved a process of evaluating the concepts against the value words and
the collected design brief to see if the triggered the correct emotional responses. To help with this the truck was, once again, broken into its constituent parts and set into a type of equalizer. For example, the bumper can either be seen as a piece of protective metalwork or as a piece for pushing obstacles out of the way. A truck in line with the value words must lean more towards protection, rather than offence. This tool derived from Anders Warell, was used as an ‘equaliser’ by pitting the feeling each part should inspire with its antonym and judging variations of the same body part.

During this final phase a “Needscope” analysis was made. This tool is mainly used for brand placement in large concerns. In the case of this report it was used to see what the authors feel the main message of the brand should be. It shows which brands it could identify itself with. The main focus of this tool was automotive brands well known to the participants. To this were added countries and larger entities and finally the parts of Eicher that needed a “home” on the Needscope circle.

The resulting knowledge is put into the final exploration phase and a number of final concepts were created and shown at another workshop/meeting with the thesis supervisors for feedback.

![Figure 19 - Needscope exercise referenced to car brands and countries](image)

### 3.9 The design brief

A design brief is a document supplied by a company contracting design work. It can either be made completely in house or in collaboration with the designer. It should express the functionality needs, budget, market and environment
amongst other) that the design will be launched into. In the case of a conceptual development project, such as this one, such a document cannot be made pre-emptively as the specific needs of the design are not yet set. It was a part goal of this project to find out what would be needed in the design brief and to thereafter create one. The points that are covered in the design brief are based heavily on the observations made, conversations had, impressions received and assumptions taken while on research trip to India. A design brief can be broken down into two parts, emotional values and physical values; an affective and an effective part. This project is mainly concerned with the conceptual and more affective values of the design, but they must of course be expressed in a physical way.

3.9.1 Why use a Design brief

In order to keep design development work on track a design brief is used. This contains the conceptual direction and guidelines within which the design should function. For more set project it may contain technical information, but in the case of this project (extremely conceptual in nature) it is more loose. It contains value words that should be reflected in the design and looks at more higher level functionality than actual details. For example; a high ride height is important due to the road infrastructure, the exact cm is of less importance at this stage. Such over stringent detailing can often kill the development process, as it is possible to follow all the measurements and regulations and allow these to “design” the truck.

3.9.2 Creating the brief

Before trip to India, research was conducted into the particulars of road-based industry in India. These points are covered in the theoretical background and express the information necessary to understand before taking the next step in the research process, namely interviews with those effected by the project. The first batch of research gave requisites pertaining to the stakeholders specific needs and the needs of vehicles using India’s road network. While these are of great importance it is the prerequisites pertaining to and based on the observations that are of the most interest in this thesis as these are the more “human” ones. It is with these values that the product will connect with the users and it is these values that will ultimately decide its worth as a design.

3.9.3 Design brief constituents

Value words – The value words were chosen post-India. They were chosen to act as goals for the design work. They were reduced during a workshop/meeting with thesis supervisors but in their first iteration they were robust, honest, Clear, Reliable, Resilient, Dependable, Purposeful and Stabile.
Icons – Accompanying the value words was this picture showing items or visions that shared some of the qualities desirable in the truck concepts.

![Figure 20 - Iconography exercise](image)

### 3.9.4 Refined words and narrowing

After a meeting with supervisors it was thought that the 7 value words could be condensed and provide more to the design in that fashion. Some of the words were felt to be more synonymous rather than distinct and they were thus narrowed down to being Purposeful, Resilience, Care.
3.10 Observations

With a design process involving such a long trip to a foreign culture it is important to keep a large observation base running. These observation are later used to extrapolate assumptions for the future; the future the design is to exist in. using the observations and experiences gained in the country it is possible for a list of value words to be created. This type of list is used often as a guide for the design. The design should conjure in the observer a sense of these words. If robustness is imperative for the design to be accepted in the culture, then the form should hint at robustness.

Value words – A list of value words is created based on the observations and experiences of the visit to India. The represent feelings experienced while in India, either from conversations with the local people or based on direct observation. They are words that the final designs should represent in order to function correctly in the environment they are intended to work in and to be accepted by the buyers and users. These words can be utilized as checks or filters. Is the design following the necessary direction?

The act of connecting a design or development process with the emotional values and responses of the user is known as Kansei engineering. It is a method used to understand how a design could both effect (physically) and affect (emotionally) users, various tools can be used to break the design down into different parts and can be tested and experienced by the different human senses. The main role of Kansei is to connect the emotional values of a product, what the user feels for it, and the physical values of a product, the size, shape, texture etc.

As the product is defined in the brief, it is possible to create a framework of equalisers of different values within which the product shall be created. The value on the sliders is changed using the physical factors but they affect the emotional factors of the product. By defining the affective results desired the physical parameters change. Conversely this tool can be used to analyse a current design to check for the correct affective responses. Deeper analysis can suggest which physical factors to change to obtain the correct emotional response.

3.11 India

This project is based around the idea of building a truck domestically in India and for the Indian market. In order to fully understand the culture the authors went to India to meet drivers, sellers, and owners of trucks. Meetings were also held with product planners from Eicher and Volvo trucks. During this trip assumptions and observations were made, there of course affected the design process and could be used like a design brief to guide work.
4 Approach and Implementation

4.1 Implementation of Observations and interviews
Whilst abroad talks were made with the sellers, buyers and users of trucks. This resulted in a massive observation bank (see appendices), these observations are summarised here.

4.2 Summary of Observations
The main research source for our thesis has been first hand interviews and observations in India. We attempted to talk to as many people as possible right across the industry. We talked to owners of large and small fleets as well as drivers, mechanics, representatives from Eicher and Volvo as well as salesmen. Summarised in these chapters are the key findings observed throughout the country. Cities visited include Chennai, Bangalore and Indore.

4.2.1 Truck design points
- Wooden trays are easier to fix are softer on the cargo and protect the teel of the truck
- A strong bumper is priority no.1
- MCV trucks can easily be overloaded by 50%
- Cowl chassis trucks with wooden cabs are cooler, cheaper and easier to fix
- A roof box is needed to store tools and tarpaulin
- Truck cabins must take a beating
- Simple truck interiors which are cool, ventilated, have storage and room live, drive and sleep.
- Visibility and a connection with the world is needed.

4.2.2 Family comes first
India is a very conservative society where family comes first. The lifestyle of the driver is not what a potential wife wants to hear about. A typical intercity or interstate driver will be away for days and weeks on end. This is not conducive to family life in India. In India the family live together, every children is seen as a blessing, it is an honour if parents decide to move in with their children. A truck driver is seen by society as lowly, venereal diseased, poor and dirty. A driver in Indore even said “the truck becomes the bride and the driver must make his bride beautiful” this is typical of the feeling felt by truck drivers, no woman will wait for them at home and the only thing they will have is themselves and the truck.
4.2.3 The driver shortage

There are a number of reasons for the driver shortage in India. Sons of truck drivers are discouraged from joining the profession especially since there are numerous other jobs with better conditions closer to home. Indian law requires a 10\textsuperscript{th} pass (completion of Swedish Grundskola) to gain a truck drivers permit, the problem with policy is that the people with this level of education have many more arguably better job opportunities to choose from. The extremely competitive nature of the Indian road freight industry also means there is little money available to provide better conditions or pay to drivers.

4.2.4 Large fleet versus Small fleet

While the majority of trucks operating on Indian roads are owned by small fleets or singularly owned the amount of trucks owned by big fleets is increasing. There are distinct advantages for owners of large fleets the main ones being:

- Cheaper and easier access to finance.
- Income spread over a large base, which gives the ability to take the time to build cowl chassis trucks and spend the time properly servicing and repairing vehicles.
- The ability to take on contract work. Contract work has benefits as the work is constant, trucks can be specialized and drivers can be employed on a full time basis, which is more enticing to drivers.
- Economies of scale.
- Larger fleets can have a mix of trucks which gives greater flexibility when searching for work and which allows higher asset utilisation.

Small fleets have a much harder time in the Indian market. They do not have the flexibility of larger fleets and find it harder to find good value financing, they also need their investment to start paying back straight away so must buy second hand trucks for immediate delivery. There is so much demand for trucks for immediate delivery that they cost significantly more than newly ordered trucks. Heavy competition means that trucks older than 3-4 years fast become uncompetitive due to outdated technology, build quality and the toll working conditions take on the vehicles. This presents quite a tricky catch 22 for owners. None the less small fleets have survived and flourished, the way they have done this is by cutting as many corners as possible.

- Trucks are overloaded to as much as double their rated capacity with bribes lubricating the way through police checks.
- Locally made parts of varied quality are used when servicing or repair is due.
- Trucks are not repaired when damaged and continue to be driven.
- Trucks are driven as slowly as possible to increase fuel economy.
Driver conditions or pay are not as good as in fleets.

4.2.5 Life of a truck

The 2 main truck categories relevant to this thesis are HCV (Heavy commercial vehicle) and MCV (Medium commercial vehicle) trucks; their payload can split them. If a truck generally carries more than 10 tons payload then it is a HCV and is likely to be multi axle. An MCV is less than 10tons and probably single rear axle for improved fuel economy. The majority of Indian HCV’s are cowl chassis trucks. A truck chassis and power train will be supplied to a local body builder where a rear tray and cabin will be built from timber.

Figure 21 - A cowl chassis truck being built up in Bangalore

Figure 22 - A line of trucks at a depot in Indore

The trucks above show a cowl chassis truck being built and the examples of the finished products.
An MCV truck almost always is sold with a factory built steel cabin. Eicher is extremely strong in this market with 31% market share of MCV trucks. Typically a commercially used truck will only have a profitable life of perhaps 4 years. Trucks are underpowered and overloaded, driven in harsh conditions.
and are maintained to basic standards. The truck means different things to different people.

4.2.6 How an Eicher truck is viewed

Resale mileage and capacity are the 3 major factors affecting the purchasing decisions of a truck. As a result the Eicher reputation is mixed. Driver comfort is appreciated and so is the mileage from the trucks however there are common issues which were noted in all three research cities. Build quality seems to be not as good as other brands. The brand reputation has also suffered as a result which affects the total cost of ownership and profitability. Deepak (large fleet) said problems included availability of spare parts and service centres. Poor resale value and sturdiness issues. Baggat Singh from SR Roadways said he had experienced high maintenance costs, engines failures and bad body strength from the steel cabs.

Figure 23 - This graph shows the major purchase factors for the Indian freight Industry. Graph Authors own work

The company is very proud of the mileage their trucks can achieve however that is only one part of successfully selling a truck in India. According to all sources to be successful a truck company must have entirely dependable trucks which make economic sense and which are supported by a comprehensive dealer and spare parts network. Genuine parts are preferred and will be used if they can be purchased quickly, however if they are not then local parts will be used. If local parts fail and the truck breaks down that makes Eicher look bad. The 2 major sources of information for truck owners in India are previous experience and word of mouth from others in the Industry. As a result a brand must make good trucks for a long time to develop a good reputation.
Eicher trucks are seen as comfortable and economical however it is felt that a feeling of strength and sturdiness needs to be added into the truck.

4.2.7 Safety and the environment

Are not important. There are so many other factors that come before this. Unfortunately in India life is cheap and the owner is not focused on safety, as it does not keep the company in black ink. From the drivers perspective also safety is seen through different eyes than it is in the west. Seatbelts are not worn however colourful stickers and bright paint will be applied to the exterior so the truck can be seen better. Headlights will be left on high beam however there is the impression that if you carefully place a small circular sticker on a certain point on your headlights glare will be eliminated. It isn’t.

Fuel is a major cost so there is an ambition to lower fuel consumption as much as possible. This is however not for the environments sake. Indian people are well informed and would like to look after the environment, however there are so many other factors affecting their ability to do so.

4.2.8 Cowl chassis is king

The Cowl chassis HCV truck is so popular in India because labour is so cheap. A truck chassis and powertrain can be purchased from a manufacturer and then sent to a local body builder where everything else is made for a price lower than what a factory could do producing a steel body. Continued benefits include ease of repair when the truck is damaged, customised and insulated cabin due to its simple timber construction and improved durability in Indian conditions. In order to keep steel cab construction costs down there are made as basically as possible. This affects strength and means that after a few bumps and scrapes the cabin is out of shape and doors do not close properly.

MCV trucks are generally steel cabin however as they can be purchased to start work immediately. They are also lighter and smaller and tilt forward for engine
access, which makes them more beneficial to have over a timber cab. Nonetheless there are still issues with these cabs. They need good ventilation and need to be made stronger. One driver in Bangalore explained that the hinges on the doors of his medium sized Eicher kept breaking whenever he had a small crash. He though it was important to have stronger hinges designed; perhaps it would be better to have a stronger cab made or a body designed in a way which is easier to repair properly.

Figure 25 - Typical minor front-end damage

Figure 26 - Major front-end damage
4.2.9 Truck utilisation

Truck utilisation per kilometre is low. The reasons include: Indian roads are slow and of varying quality. Average speed of a truck along a highway is probably only 50kph, the distances travelled can be very long and cities are extremely congested. Highway projects like the ‘Golden Quadrilateral’ project produce new multilane roads connecting the 4 major cities of India however the type of roads built are very different to European highways. The roads are built to last a long time and to take high axle pressure, they are not built for high speeds or for smooth travel. On rural roads surface quality is very low and speeds are even lower.

Indian trucks are generally underpowered; the ability to travel at high speeds is hampered by this. The reason for the low powered engines is to save fuel, as it is the major cost associated with road freight in India. Truck drivers strive to use as little fuel as possible and so they take a relaxed driving style. There is no financial incentive to reach the freight destination quickly as if the truck does not have contract work it will take time to find goods to return the driver to their home city.

Upon arrival at the destination depot it is likely that loading and unloading will be completed manually which takes time so the best thing to do is to drive slowly using as little fuel as possible. This style very much suits the relaxed nature of life in India however it does nothing for truck utilisation, which in turn reduces the amount of money able to be made from 1 truck.

For comparison a 2 man team delivering goods in America will travel twice the distance than a 2 man team in India during the same time period.

4.2.10 Proud India

During the course of our interviews we got a real sense that Indian truck owners and drivers were had a real sense of pride for their trucks, companies and countries even if perhaps they were looked down upon. They felt like they were professional and did their work well and we got a sense that they wanted their trucks to reflect this (for no extra cost of course!).

When asking about aesthetics we always got negative answers, and suggestions to focus mainly on the function however we did get a sense that like the west aesthetics and design is not a subject that can be talked about with many men.

There is evidence however that design does matter. According to Anil Bajpai our contact at Eicher trucks the ‘curvier’ models in the range have sold better, Baggat Singh from SR Roadways Indore expressed that he wanted his trucks to look ‘professional’.

There is a sense that if a truck was designed to appeal to owners aesthetically it would sell better. If a truck looked profitable or like it could get the job done it would have an influence on the purchaser even if (probably he) doesn’t recognise it.
4.2.11 Genuine parts

Genuine parts will sell and provide a secondary revenue stream for Eicher if they provide competitively priced parts EVERYWHERE. The fleet owners and mechanics we spoke to all agreed the genuine parts were better for the truck, lasted longer and were more reliable. The issue was they were generally not available where and when needed quickly. This is a major issue when owners are working against the clock to pay off their loans. Trucks cannot stand idle.

Figure 27 - Working on a broken down Eicher in Chennai
5 Design process

In this section the implementation of tools is shown. As much of the work was carried out in tandem, tools used are presented in one section.

5.1 Common tools

As a result of developing 2 trucks based on the same research and with the same goals in mind, many design tools and exercises based on our design research were completed together.

5.1.1 Equaliser tool based on Kansei engineering

We developed an equaliser modified to our needs based on the example developed by Simon Schütte (2005) in his Dissertation "Engineering Emotional Values in Product Design - Kansei Engineering in Development.” After the concept gate meeting with Glen Barlow and Lars Eriksson we felt the need to really inject more of the right types of emotion into our designs. We focused on doing this and to ensure that the right emotions were being injected into the design our modified equaliser was used.
Our equaliser was developed by breaking our truck into components deciding what those components main emotional task was and plotting that on an equaliser against its opposite much like the original ideas of various researchers shown in the Schütte (2005) paper.

![Kansei equaliser example](Schütte, 2005, p74)

The most promising truck designs were chosen and put through our equaliser in order to be able to compare designs. The benefit of this model was that it did give us easily comparable data, quickly. We were able to throw a number of designs onto a table, break them up and on scraps of paper go through the design quickly and objectively.
5.1.2 Iconography/Breaking down the trucks

An iconography exercise was used to break sketches down into their most important lines as these are the most instantly recognisable. This is explained further in the Individual sections.

Figure 29 - Diagram showing some examples of the equalisers used

Figure 30 - Iconography examples
5.1.3 Story boards

In conjunction with the keywords a story board was made to visually show the feelings that were to be shown in the truck. This board turned out to be a hindrance more than an inspiration as the picture were of western objects which would not appeal to the Indian market. They were easier for the Authors to understand but probably detrimental to the development of the Indian trucks. When the authors re-ideated the story board was scrapped.

![Figure 31 - Story board](image)

5.2 Michael Pye

Personal account of the design process by Michael Pye

5.2.1 Robust – Honest – Clear – Reliable – Resilient – Dependable – Purposeful – Stabile

Ideation started after Philip and I returned from India. We sat down with our teacher Olle Classon and mapped out a plan for getting our observations into a truck.

1. The initial plan was to make a mood or story board showing the feeling we wanted to impart in our truck and also develop a word list that we could use to reference our designs to and judge them by, all very
Kansei-ey. The words above were chosen and a story board was made, ideation began.

2. The first ideation step was about content and quantity. Big sheets of paper were used to draw 2D sketch after sketch. HCV and LCV sized trucks were drawn to check for scaleability. From those drawings, I asked as many people in the studio as possible what they thought was the most successful design when compared to the key words.

![Image of 2D sketches]

Figure 32 - 2D illustration

3. 3D sketches were then started using both manual techniques and photo shop. This was a more difficult and slow process due to the perceived need to show detail and to have the output at a high quality. As shown later the process was a mistake as this project is more about finding the right emotion for the project not focusing on features or drawing beautiful pictures.
4. After a range of sketches were developed Philip and I undertook a ‘Deconstruction’ exercise where we attempted to break down 8 of our most promising concepts into their main elements and try to define what was good/bad. We also looked for features that were common on many trucks and worked. We were especially interested in the iconography of the truck.

- What the types of shapes and lines form the stance
- What the part lines and outlines of componentry said about the truck
- The feeling these symbols imparted was important.

Phil and I both worked hard to give the trucks the right feeling. It was too easy to draw a very angry looking, or an emotionally meaningless truck if you just let the features required in the vehicle build the shape.
After the deconstruction exercise we then moved to define a concept we wanted to move forward with and develop variations on the theme in preparation for a check point ‘gate’ meeting with head supervisor Lars Eriksson and Volvo mentor Glen Barlow. The features I wanted to show were decided upon and my “design language” was set, variations were developed.

The next page shows the concepts presented to our Volvo supervisor and Lars Eriksson at a major thesis gate meeting for the project.
Figure 35 - Initial concepts
5.2.2 Purposeful - Resilience - Care

1. The gate meeting gave cause to take a few steps backward. Our focus was off. When you look at the truck market in India and worldwide, truck specifications, prices and capabilities are very similar. A rational case can be made to purchase any truck in the domestically produced market segment Eicher compete in and so it comes down to other factors to decide which truck will be sold. Yes superior technology, features or capabilities or reputation can spell success for a particular brand but when competition is close so can other intangible factors. If a truck feels ‘right’ then the purchaser will find a way to justify his or her purchase with more tangible and acceptable reasons. We were encouraged to “go back to India” and search for the right feeling. We stopped thinking about features, details and pretty pictures and focused more on designing a truck which we felt captured the right feeling of India.

2. Partly during and after the gate meeting our keywords and ambitions for our trucks were narrowed. Instead of 8 keywords for the exterior and a separate feeling for the driver focused cabin we focused on 3 words Purposeful - Resilience – Care. Instead of a story board built using western pictures we attempted to go back to India by covering our sketch pages with pictures taken while on holiday in India or with pictures of objects we think would appeal to Indian people. India is a positive, optimistic, society. Indians like to connect with the world around them and be a part of society and we wanted to make that possible for trucks drivers while making the truck appeal to the owner.

3. Philip and I went back to the Ideation drawing board and attacked the task from a different angle. Instead of attempting to draw beautifully it was more about being “quick and dirty”. Our ambition was to find the right feeling, we only sketched in 3D and attempted to draw a picture of trucks fitting in with Indian society or in a setting that Indians would understand or be proud of.

4. Personally I focussed on designing a truck which looked capable and determined but not aggressive. India is a very inclusive society and it would not be acceptable to build a truck which screams “get out of my way!”
5. We tested our trucks using in the Kansei ‘equaliser’ explained in the combined implementation section.

6. 7 days after our “re-ideate” period we had a second gate meeting where the concepts chosen to be taken forward were chosen on. The trucks chosen must be scale-able and have the ability to have slightly different looks for different applications.

7. Further definition in preparation for Alias was then undertaken.

Figure 36 - Re-ideation period
5.2.3 Final concept

The two concepts presented below show the vision for the truck going forward into Alias. A truck which is fit for its purpose but not aggressive was required. The 2 sketches are set in a Dakar rally scene and a typical depot in India. The reason: to give the right feeling of which scene the truck should fit into and in the case of the Dakar truck show the inner strength the truck must possess.

The Dakar rally is the hardest road race on earth a truck based on an Indian market truck should go well due to the harsh environment the base truck would be operated in every day. An Indian Dakar truck could be something which would inspire Indians as they could relate to it.

Figure 37 - Final concept
5.2.4 Alias and model development

From the final sketches an Alias model was built for the purpose of making renderings and as a basis for milling out a 1:10 scale model. As a result of having to re-ideate time was short. This resulted in having to do detail work whilst modeling which turned out to be a hard task. Alias is a program that gives the user 100% control but in doing that the user must know exactly what they want. This indecision on my behalf took some time. None the less the final model was finished and I am happy with the result.

The 1:10 scale model was also full of difficulty as the intention was to have an outside company build the model. This proved extremely frustrating as despite promises of support and student prices local modeling companies final price estimates within the time schedules were way too expensive and the lead time too long. My model was then constructed by myself while Phil constructed his. The models were cnc milled on the school 3 axis mill. Whilst we are happy with the results of our work we both felt that the size model made was too small and meant that features were not easily seen on such a small scale model.
Figure 39 - Final truck rendering
Figure 40 - Truck features

- **Flat roof** provides room for addition of a roof box.
- **Open back box** provides enable easier manual loading and more cargo to be carried.
- **Extra side glass** provides connection to the surrounding community for the driver.
- **Orange mandatory reflector** integrated into the design.
- **Visibility important** and is increased by large glass area.
- **Recessed and protected lamps** with large reflectors for increased visibility.
- **Protective but not overly aggressive** rap around bumper to protect.
Figure 41 - 1:10 scale physical model
5.3 Phil Allison

5.3.1 Process breakdown

the process follows a traditional design process very closely, it starts when the brief is obtained with general concepts and sketches, expands into a much wider sketch base and semi-finalised concepts, there is an effort to narrow the concepts based on the brief and observation and then more are created (see the double diamond in chapter 4). The final batch of concepts are conceived with consideration to the brief. They exist as it is easy to get lost in the design work, they represent concepts that have been worked with and then brought back to reality.

It was chosen to not be a slave to the old Eicher design language as it has been around since the 80s, is represented on many other road vehicles and because Eicher wish to build their own platform. As this frees up the design it was chosen to use this opportunity.

The steps taken were thus:

Simple sketches
2d sketches showing the front and sides

More detailed sketches
Based on the 2d sketches simple trucks were constructed

Concepts
These went forward into a first batch of concepts

Deconstruction to basic lines
The concepts were boiled down to their basic lines in order to build a design language.

Exploration of the lines
The lines were used to explore on shape variation while keeping the language created.

Concepts
A batch of concepts made based on the explored design languages.

Step back
“going back to India” checking the concepts against the brief, the observations

Final concept
From the step back concepts were made and combined to the final truck. That was then built using CAD software. From the CAD a physical model was built.
5.3.2 Process detail

The simple sketches
The design process started with the drawing of side and front views in order to get an understanding of the shape and proportions of different sized trucks for different applications. This worked fine as an exercise but did not get to the core of the issue. This sort of drawing exercise works well when the results are concerned only with form and proportion, I think, but for more emotional impact more work has to be done first on things like value words and mood boards of observational goals.

This step gave some fine looking trucks, but they were objects of pure fantasy with no real meaning behind them.

![Figure 42 - Example of early line drawings](image)

From the first stage of the concept development can be seen in the above picture. They formed a starting point for further development. But also held me back a little. It was important to let the very mechanical pure 2d trucks go and to focus more on the emotion and direction of the design.

After being in India we knew the environment that the vehicles would be in, the people who would use them and the culture they would be built from and add to. Once we had tapped into the culture and had an understanding of the people it was easier to generate concepts around a real vision of India and a real vision of the trucking industry. We could start work on a loose brief and list of value words. To begin with the value words were: robust, honest, clear, reliable, resilient, dependable, purposeful and stable. They describe admirable qualities for the truck to have. These words were to act as guides for the designs and to act as a mental
filter and keep us on track. Much like a mood board of brief, they were to guide the design.

From the early truck drawings more correct concepts could be created that were in tune with the brief and analysis made of India and Indian trucks. Of the concepts made in this stage, eight were chosen to be taken forward to the deconstruction or iconography stage. Here they were boiled down to the most important and quickly recognizable lines. These are the lines that stick in the minds of people who see things and give the truck a very clear “face” and expression. With an exercise like this it is possible to see the expression and tweak lines as needed so that the expression is the sought after one.

Figure 43 - Concepts taken forward to the iconography stage

The above concepts were chosen because they felt to be most in line with what the vehicle should be. They all have a distinct bumper and some asymmetric features.
Figure 44 - Results from the iconography phase

The most important lines from each concept were boldly drawn. Even though there is very little detail, it is possible to have an understanding of the trucks size and proportions. In this case we knew that the truck had to have a face, something to identify with, it had to look both purposeful and on-task without being to overpowering and aggressive. India is a country most concerned with relationships and people, this has to be a design for people.

As we did this exercise we started to develop a design language for the individual trucks. The observations and experiences stood for the emotion, drawings created with this in mind stood for the shape. Discussions led to a refinement of the lines and it is these lines that get taken into the next step of concept development.
It was decided to work on a concepts focusing around a clear lines dividing cab and bumper. Features like headlights and grills can hang of this line and it gives a clear division of tasks to the front of the vehicle. Below the line is the engine, cooling, brakes, wheels and so on. Parts that the owner is concerned about as they are what makes money.
Above the line is the driver environment and the driver, traditionally the less cared for side of the industry. Both sides of the line have different factors and requirements, the owner of the truck wants fuel efficiency and timeliness (below the line) whereas the driver needs a vehicle that is comfortable and good to drive (above the line).
Figure 45 - The key design feature

Figure 46 - Refined lines drawings based on the iconography.

With this in mind the concepts were refined and redrawn further, this time resulting in some that where going to be shown at a meeting with thesis supervisors. There was some pressure here to create works of impressive quality, but this was a step too far at this stage. During the meeting the process so far was presented along with the value words and pictures. It was felt though that the work had drifted too far from a conceptual truck for India into “just a truck”
territory. We had taken the concepts too quickly from the emotion phase to a phase of trying to make a pretty picture. It was also decided that the value words should be work-shopped into a more manageable number with more definition. At the end of the meeting it was made clear that some time should be spent exploring the concepts and getting “back to India” so as not to lose the original focus. And thus another period of drawing commenced with the value words resilience purposeful and care.

Figure 47 - First meeting concepts
These trucks were presented at the first meeting. The concepts are based around the clear dividing line across the front and of asymmetric windows for a purposeful look.

In the final concept drawing phase emphasis was on exploring the current concepts, making sure they kept a clear focus on the brief and refining them thereafter. It was in this phase we could make most use of the equalizer tools, setting up limits for the different features on the vehicle.

Figure 48 - Concept refinement

Figure 49 - Side view rendering
Another meeting was held with supervisors showing the results of this final phase. The concepts shown above were shown then along with the two on the next page. They are evolutions of the previous bunch, more about exploring the possibilities of the line and asymmetry than producing a picture-perfect sketch.

During the final concept meeting it was decided to combine 2 concepts sketches into one and use this as the underlay for the CAD and model work that was to follow. The pictures below are the final sketches that were combined.
Figure 50 - These sketches were combined
Figure 51 - Final concept rendering
Some features of the truck that make it suited for the job are the high stance and large windows, giving it a sense of vision and mobility. The asymmetry in the window gives the feeling that there is more glass in front of the driver who can therfore see well. The asymmetry works with the sense of purposefulness. The feature is where it needs to be, nowhere else.

The combination of steel and plastic in the bumpers keep it modern but also looking strong. The look is found on many SUV and crossover type vehicles today. A big happy grill and a clear division of cab using the top line of the bumper section finish the cab design. As mentioned before the line helps divide function and prerequisites but the segmented look also speaks of the ability to fix and replace parts.

The bar over the lights protects them, as does the fact that they are set into the bumper.

The next step is to build a CAD model from this sketch.

CAD

A 3d model was built using Autodesk Alias surface software. From this model renders were made and a physical model (for exhibition purposes) was built based on this file.
Figure 52 - Screen shot of the in progress Alias model
5.3.3 Final concept

The physical model was built based on the CAD file for the thesis exhibition and to show AB Volvo at their design studio in Göteborg. Pieces were milled in a 3-axis machine, finished and assembled by hand and then painted.

Figure 53 - Final physical model, during the process of adding a tape shut-line

In order to show the truck from different angles and in a correct environment the rendering program KeyShot was used. It enables the designation of materials and colour and generates a rendering based on lighting and environmental presets.
Figure 54 - Final rendered model
Figure 55 - The final concept
The most important features from the previous steps have been brought forward into the final concept, they are;

Rough plastic wheel arches and lower bumper, such as would be found on an Suv or crossover vehicle give the truck a safe surround.

Dimples in the bumper give a natural place for additional headlamps, customisation is thus allowed yet happens in a way that does not compromise the design, and can be done with OEM parts.

The sock headlights are set into the higher bumper and are protected, the assymetric window gives a sence of purpose and visability. Perhaps production models cannot afford glass all the way, but a plastic piece could be made and be used to hide windshield wipers or vents. This is also an eye-catching place for a badge.

The cab is long enough for a bunk across the back. The roof is flat but with a deep pressing for a vent. Any roofbox or storage unit would fit above this vent. A pressing in the door panel could be cut out to allow for more widow glass.
6 Result

Results of the observations, interviews and data analysis gave us sufficient knowledge to create a design brief comprised of value words, a story/picture board and stuff relevant in the use of Kansei methodology and a list of features deemed desirable to the level of standardisation.

6.1 It’s not about the truck

It’s not about the truck.

As can be read in the chapter and appendix of observations from India, the industry as a whole is facing a number of large scale problems. The most obvious of these could be the lifestyle and reception of the drivers (that is: their low status in society and the view of being unhealthy and uneducated, amongst other things) and of the non-enforcement of laws and regulations.

Other problems are the incredible dips in productivity caused by loading times, border crossings and the down time of broken machines. Few long distance drivers have families, a combination of lifestyle and the perceived lifestyle works against them and they are seen as “undesirable husbands”. Those that do have families are dissuading their sons from continuing the work. These combine to form a rather dim view on the industry and its practitioners.

This is leading to a shortage of drivers in today’s market and it is the drivers that form the focal point of a large web of interlocking issues and problems where no single solution will solve all the issues, but an incremental improvement across the board will. There is a knock on effect that cannot be underestimated, if truck design supersedes the infrastructure, they will fail, but if the infrastructure does not encourage and nurture truck design then the industry will stagnate and maybe collapse.

The design of the truck is a small yet significant part in this larger puzzle of the Indian trucking industry, but It is hoped that well-made and designed trucks will improve the perception of the drivers, which will make the job more attractive, and so on. Leaps of improvement in the quality of domestic trucks could in turn spark a leap in road building of logistics implementation, and thus the industry as a whole moves forward.

When it comes to the future of India’s road based industry, it is important to look beyond the truck, but at the same time, to remember that the truck is the most outwardly obvious element of the industry, the job, the people and the lifestyle.

6.2 The brief

Primary desire

An Indian truck.

Major specifications

- The truck will be manufactured in India
- The truck will be tailored to the Indian market
Conclusion and discussion

- The truck will be designed with the needs and requests of all stakeholders in mind
- The truck will be designed according to the values of AB VOLVO

Details
- The truck must be physically strong and durable and reflect this in the design. A strong cabin and a body that can work reliably on Indian roads is a must. Maintenance must be economical and straightforward.
- The truck must be designed in a way that allows the Indian freight industry to do its job in the unique way in which it is done. Roof storage or similar must be provided for the necessary equipment, furthermore access must be provided.
- Damage and accidents to trucks are mainly concentrated around the front of the cabin. Behind this area are the most necessary and expensive parts of the vehicle, the radiator and power train. From a functional point of view these areas must be protected from damage, from a safety point of view the same point applies.
- Ground clearance is a must for an Indian truck.
- Low running costs are important so aerodynamics is something that could be of potential help. Speeds are increasing on Indian roads and the truck must reflect this, also consider ground height.
- Visibility and good lighting are needed at night.
- The ability to quickly and cost effectively repair a truck is important, down time means loss of income.
- To differentiate from the homogenous line up of competitors on the Indian market the design of the new truck must be distinctive, memorable and appealing, while reflecting the values of the brand.
- The exterior must provide space for a comfortable and appropriately equipped interior. The cabin environment must be considered from a comfort perspective. This includes driver ergonomics, availability or fresh, cold water, internal lighting and cooling.
- Trucks are frequently customised in India today; it would be preferable to facilitate this customisation while keeping the Eicher visible identity intact.
- The loading bay area has to be versatile in order to transport a wide range of goods. Options of tarpaulin, lids, covered or fully built bay should be considered.
- The interior should cater to various types of applications. Long haul trips require food and water storage, crew luggage storage and sleeping facilities of some kind.
Conclusion and discussion

6.2.1 Words

Robust, Honest, Clear, Reliable, Resilient, Dependable Purposeful, Stabile are the key words that were stared with at the beginning of the design process. It was felt these words expressed exactly what was needed in the truck, based on the India observations. The problem with the words was that some of the words were quite similar and having so many words made the design process difficult as there were too many key words to think about.

At a design process gate meeting with supervisor Lars Eriksson and Volvo mentor Glen Barlow, the words were refined to just three based on comments from Glen and Lars. Purposeful, Resilient and Care were the new focused words. Concept generation started again, the second time round was much more successful as freedom was gained.

6.2.2 Picture game

Results of the picture game
The results of this were unfortunately bad. Several factors cause this. Even though there was a clear international selection of brands, it seems that while these were well known in Europe, they were less well known in India. This meant that the brand identity could not be called upon to identify with.

Another problem was the language barrier. There are 28 states in India, all with their own local language. The official language is Hindi and the business (and authors’ first language) language is English. The mere task of explaining what we were doing was, at times, difficult. At one point we were translating English via Hindi and a local language in order to talk to a driver. This element of “Chinese whispers” led to confusion and we suspect much was lost in translation.

This tool was abandoned fairly early in the trip based on the confusion it was creating. This can be seen as an example of a method in action but failing because of the environment of deployment. The picture game was unsuccessful due to the large cultural differences and language barriers.

Figure 56 - A confused driver in Bangalore, India.


7 Conclusion and Discussion

The thesis completed was huge and as such after the thesis was started, the focus had to be refined. We feel that there is definite room for a continuation of this work. A similar project focused on the interior would be a good start. Focusing on aftermarket parts and truck variants would also be another project. Of particular interest would be looking at the roof box, a feature needed on most Indian trucks and briefly discussed in the thesis. To design a truck in the real world takes a long time and a number of iterations, we feel like our efforts are just the first scratch of the surface. Looking at the models made, it can be understood why Volvo designs trucks differently. The models made while nice to photograph and place in a portfolio don’t really show much at this stage. Perhaps a number of larger simpler ‘white models’ showing only the proportions and attitude of the truck would have served us better. Something to focus on would be a project looking into the emotional needs of the drivers. We know from our time in India that they have a low status in society and have rather dim prospects in life. The emotional needs of drivers are something AB Volvo values highly and should be looked into by its joint venture brands.

There has been a noticeable difference in Academic theory pertaining to design and the real world. Design is about emotion and the intangible and to heavily lock ‘design’ down into engineering terms and measurable variables is almost impossible as it just isn’t flexible enough. Where the theories work best are in explaining a design to others who prefer straight facts after the fact.

By far the most successful part of the thesis was the trip to India and the resulting information gained. 3 weeks was barely enough time to start to understand the culture and the people who live in this amazing country. The Authors feel the research gained from the India trip is invaluable. When looking back on our assumptions before the trip we found that while they were right they were also wrong. The facts and figures found in literature were all correct, the conclusions found in literature were all correct but they filter out the most important factor for design, which is human emotion. The trip to India gave us that insight into the people that we could not have read in a report. Our number one tip for designing for India would be to go there and to experience the country and involve the locals! You need to feel the intangible and include people who can add the write emotion to a design. It is the role of the designer to distil that tacit knowledge into a product.

The major difference between students and professionals taking on this task is that we have been learning what to do as we were trying to undertake the task. While this has been extremely beneficial to us the students and our learning process, it has meant that the process has taken longer as there have been a number of extra design iterations to be able to go back and make corrections after feedback from the ‘client’ Volvo.

All in all, the project has been extremely rewarding and eye opening and we hope to continue refining our design process throughout our careers.
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9 Attachments

9.1 Thesis Proposal: Volvo Trucks Gothenburg
Design Concept study for an Indian truck

Thesis mentor/contact: Glen Barlow - Volvo Advanced Design Gothenburg
Participants: Michael Pye - Högskolan i Jönköping
            pymi1086@student.hj.se
            073 323 20 72
            Philip Allison - Högskolan i Jönköping
            alph10id@student.hj.se
            073 690 75 16

Aim: A new Indian truck for the Indian brand Eicher.
Justification: The western world is not where the money is anymore. The transportation market in the west is highly competitive & has many players, all factors favoring the move into new global markets. There is potential for the ‘BRIC’ nations (Brazil, Russia, India & China) to provide future prosperity for AB Volvo. These economies are growing very quickly and their need for transport is insatiable. Volvo group now has a 50:50 partnership with Eicher, how can this partnership help the future prosperity of both companies? The idea is not to build a cheap Volvo, as this would be out of context with the two brands.

The project: Utilising the new Volvo / Eicher partnership, the aim is to develop the Eicher brand so that it becomes stronger first in India and then potentially internationally’ while becoming more suited to its customers be them fleets or single owners.

Thesis proposal: The next generation Eicher. Take what Eicher have and do well and instill the Volvo group value of safety. Thereafter design a truck that best suits the market segment and user. This new design should be sympathetic towards local production methods, labour availability and supplies. It should be designed for the infrastructure (labour, materials, roads, culture) of the specific market of sale. Instead, a market should be identified and cemented, a customer and/or user profiled and the truck design be tailored towards this.

1. What is the Volvo group? What do they stand for?
2. What is Eicher? What do they stand for? In what market segments do they compete today, what are their future plans?
3. Who are the Eicher customers? Fleets or Individuals? What do they use their trucks for/how? What does their
truck mean to Eicher owners? What do they want an Eicher truck to be and to say about them?
4. What is available locally by way of labour and supplies? How does the supplier and aftermarket supplier system work? How can we use this system which is beneficially for both Eicher and their suppliers?
5. How can Eicher tap into the customization culture in India? What about the “pirate” aftermarket parts can Eicher (and by extension, Volvo) be a part of this?
6. Market specifics? What truck(s) to build?
7. Concepts: The right truck? The customizable truck? The reliable & maintainable truck?

Conclusion: After gaining knowledge of the Volvo group, the way it builds trucks and its strategy for Eicher we will be focusing out attentions on India. This project will research the people who will buy and drive the new Indian Eicher, the way this truck will be built and finish with developing concepts in tune with our research. We aim to develop a design concept(s) which at its heart is specifically built for the owners and drivers of the new Eicher. If we achieve this we feel it will be a success for Eicher, Volvo and their domestic parts suppliers.

9.2 Unstructured interviews Indian style

9.2.1 Chennai with Srinivasan Spider Corporation 24th February

On the 24th February we met a collection of truck drivers in an industrial area on the outskirts of Chennai. The industrial area like all of Chennai is nothing like you would imagine. The city of Chennai with its millions of people feels like a succession of small towns, slums and villages that have joined into one huge area. There are no huge buildings or well developed infrastructure, it is hard to find a city centre or a central hub there is just people everywhere doing things everywhere. The industrial estate comprises of small homogenous factories which all seem to have one specialised job to complete. The factory we toured just made dies for extruding plastic pipes. It would then send the dies to another small company which only extruded them and so on. Interestingly the company found it hard to find good material to make the dies from so to ensure they had good material, the company would buy scrap material from certain products and use it. We saw an old propeller shaft from a ship being cut up to be used as a blank for die production in the lathe. Apparently old railway lines are good material as well.
Srinivasan, the owner of the small company, then took us to meet truck drivers. Phil and I, thinking in a western way, thought we would be going to a logistics company or some sort of dispatch centre. We were a little shocked when we drove through the streets to a road just wide enough to park trucks down each side and have enough room for thoroughfare down the middle. There lay 10’s of trucks parked for the night. Standing around the trucks were many of the owners and drivers, fixing up last minute tasks, having a chat and winding down.

We learnt that labour is extremely cheap but it is hard to keep good workers. Paying them more or providing better working conditions was out of the question, we assumed it was because of the competitiveness of the industry. There are heavy government restrictions on importing trucks including a 30% tariff, which meant that imported trucks were not affordable. Even if they were the size and weight of a European truck would be too big and heavy for India roads. Ashok Leyland is dominant in the south of India, Tata in the north. Eicher is a smaller player although it has a good presence in Chennai. It is rare for truck owners to drive trucks as it is so cheap to hire someone to drive.

Small Indian body building companies can build extras for the truck very cheaply much cheaper than it would be if you bought it from the manufacturer. Indians like wooden trays or wood lining as it does not damage the cargo and it is easy to fix if it gets damaged itself. Eicher is a middle distance truck, not generally used for cross-country expeditions but more for regional links centred around a major city. The furthest typical distance driven is to the next big city, in the case of Chennai that would be Bangalore a few hundred kilometres inland.

When asking what good are typically carried the answer followed by considerable laughing was anything but bombs. One driver even said that he had transported Buffalo once.

When loading goods into the truck there is a process. First find out how much weight your truck is allowed to carry and then double it. Tie it down with your tools, rope and tarpaulin, carried on the roof of the truck.

When travelling the biggest trucks have 2 drivers and a helper or cleaner as they are called here. Generally there is a bed in the back of the cab so one driver can sleep while the other drivers. They take all the food they need with them. This may mean 10-15 days supplies on the larger trucks. On the biggest Eicher trucks there will typically be a driver and a cleaner. On the smaller Eicher trucks just the driver.

There are no worries about finding return work to Chennai the works say it’s easy to find agents and get a return load. Talking to one Eicher driver they average 50-60kph max out at 70, the trucks are limited to 40kph in the city and in a lot of Indian cities are only allowed to enter after 9pm at night.

A 6 ton Eicher truck typically would take 9 tons of load easily.
Drivers like Eicher trucks as they are comfortable and they have power steering. No trucks have air conditioning; it is a dream for some of the truckies to have it though.
You must have a strong bumper bar as radiators are prohibitively expensive to fix and are easily broken on the terrible Indian roads.
When talking about alcohol and driving, all the drivers had a big laugh because there is a joke in Tamil that translates to “fuel for the truck, fuel for the driver”. It is a very common part of the trucking life to drink and drive. Going further talking to the truck owner’s they see drinking as a huge problem as the driver’s get paid very little so when they buy alcohol it means that they have less money for good food and therefore don’t eat properly.
Trucks are individually painted and painted brightly to stand out. There are not a lot of different truck styles out there so owners want their truck to stand out so the company gets recognised and so the their truck is recognised. Religion is the most common way to individualise the truck Hindu gods for the Hindus, Symbols for the Muslims, giant candles for the Christians. Also Indians feel that a bright truck is a safer truck.
On a side note at this point in the conversation a heavily packed bus trundled by and I remarked at how full it was with the reply being “that’s nothing you should see them in the morning they can get 200 people on a 50 person bus”. Comparatively truck driving is a good job compared to many other professions in India however it is not a respectable profession, drivers are considered to be uneducated, illiterate at best. The pay is ok and the conditions are bearable, however not so many people are interested in the profession as you cannot have a family easily. There are very few second-generation truck drivers, fathers do not encourage their sons to enter the profession due to the way it is viewed. It is also hard to find a wife as all the women think you have AIDS. India is an old fashioned and conservative country with the family at its heart. You must dress modestly we have been laughed at for wearing shorts, you don’t date your parents help you find a woman then you get married and then your family becomes the centre of your life. The wife stays home. The truck drivers expressed that money is not of utmost importance in Indian culture.
We tried to talk about the look and aesthetics of trucks and as we expected after experience with men and a previous project it was a disaster. They couldn’t understand what we were talking about at all just engineering, quality, reliability.
Air conditioning: Is a status symbol and trucks don’t have it. Cars with A/C have the feature written on a sticker on the back of the car next to the ‘no hand signal’ sticker!
Thoughts on the next Indian truck: Same size, in India there is no room and there is a developed system of transit.
Trucks on the highway, midsized regional trucks, and tiny little Tata ace-esque trucks in the city. The bigger the road, the bigger the truck, tractor trailers on the highways, then smaller Eichers to the cities then aces in the cities. Multi axles, more weight in the same package.
In India foreign trucks are so expensive that they can be seen as a status symbol.

9.2.2  Bangalore 27th February – 2nd March

The trip to Bangalore was a whirlwind of meetings, field trips, factory tours, observations and more meetings. Overall it was a very successful trip.

9.2.2.1  First meeting Rahul Monday 28th February

At first glance the Volvo offices in their Bangalore business park could be any office for any multinational company in any European city. Only after you take a second look do you start to realise that no in fact you could only be in India. Suit coats are non-existent, traditionally attired waiters deliver sweet Indian tea and purified bottled water. Leather chairs in the lobby area are in fact ‘pleather’ and the build quality of the office at a level indicative of the quality expected of an Indian builder building a piece of Europe in his own city for the first time. From these offices we were to meet our contact Rahul Agarwal and embark on an extremely productive few days of fact finding and familiarisation with the Indian market. This is precisely what happened. If the results of this thesis are helpful to ABVolvo then much of the credit must go to Rahul’s, experience, intelligence and hospitality. After introductions to Rahul and the obligatory chat about cricket between the Australian and the Indian work began, the key points summarised below.

Indian is a country on the move, business is booming, cities are filling up and infrastructure is stretched to its limit. So much so that trucks are not allowed into Bangalore, Chennai and other cities between 6.30am and 9pm in order to alleviate congestion. The country contains 1.2b people spread over 28 states, speaking English at work, Hindi nationally and their own regionally dialect locally.

In a country where so much is happening and where the country is progressing so quickly it is logical that the road transport industry would change as well. Rahul briefed us on the hub and spoke logistics system and high likelihood that the whole truck industry would use the model in the future. For more information on hub and spoke logistics please refer to the following diagrams and their links.
The journal article *Hub-and-spoke networks in air transportation: An analytical review* explains the hub and spoke network as “the reduction in the number of links is made possible by the establishment of hubs or transhipment points. In a pure hub-and-spoke network all links must either begin or end at a hub.” Page 276 *Journal of regional science*, vol. 39, no.2, 1999, pp.275-295. According to Rahul the move towards truck ownership by fleets as opposed to the past where trucks were privately owned is indicative of the move towards a hub and spoke system, where large trucks ply the highways and smaller trucks service cities and local regions from highway located warehouses. The move towards fleets is also exacerbated by the fact that costs.
associated with transport are increasing and profits are being squeezed, a problem that can be alleviated by economies of scale. As a result of the high competition of the Indian logistics market and Volvo’s brand name products not being suited to the Indian market. An alternative product must be sold. Rahul believes in India there are 3 golden factors owners pay attention to when choosing a new vehicle resale, mileage & capacity. High competition in the trucking industry does however spell good news for truck manufacturers as trucks must be updated every three years as demanded by industry for reliability reasons and to stay competitive. This is also good for the environment in a country where it is often neglected. New Indian trucks are subject to emissions standards however the restrictions are approximately 5 years behind European emissions standards. Not only are emissions standards being strengthened by Indian legislators but Traffic laws are slowly becoming stricter and better enforced especially in larger cities like Mumbai.

Turning back to the topic of trucks, especially heavy commercial vehicles (HCV’s) Rahul talked about a few interesting and uniquely Indian facts. Cowl chassis trucks are better suited to the Indian climate being made of wood they have natural insulation so the lack of air conditioning is less of an issue. Secondly drivers try to drive in the cool of the night where possible. The average journey distance per day for a HCV is around 350-400km day travelling at less than 50kph. The two most popular truck brands in the HCV market are Ashok Leyland which is more popular in the South and Tata which is the major brand in the north.

Indian truck usage and purchasing decisions seems to be slightly different to Europe. Buyers are usually quite hard edged and do not let much emotion come into the equation when buying trucks. The truck is seen as a tool to be used to make profit. The truck purchased must exactly suit the indifferent freight climate where truck utilisation is low at less than 100000km/year and trucks with high power and speed capabilities are a burden as they use more fuel and are unable to be used to their true capabilities. Truck utilisation is low due to the slow pace of loading and unloading, slow road speeds and uncertainty of return loads.

There are numerous barriers to entry into the Indian road freight market. Financing is expensive, competition is large, and the amount of trucks needed in profitable fleets is increasing. The chances of a new comer operating a small fleet and surviving is decreasing. The best way to be profitable in the Indian market is to be awarded a regular freight contract with a large company or organisation. The problem is to be a awarded such a contract, companies expect new trucks which take time to be delivered and cost money. As a result only large operators replace trucks with new trucks regularly as small operators cannot afford to do this. Generally small operators buy second hand, which results in huge demand for second hand vehicles. The obvious Catch 22 of this situation is limited competitiveness and profit making ability, in short you need money to make money. There is a glimmer of hope however for small truck operators as the government want new trucks
on the road in order to lessen truck related road damage and pollution. New regulations are set to favour purchasing new trucks and should make it easier to do so.

9.2.2.2 Fleets and running drivers according to Rahul

Generally with increasing in fleet sizes and competition, more professionalism is coming into the industry and more similarities with European trucking companies can be seen.

Large fleets buy genuine parts as in long run truck reliability is better. Rahul insisted that education on genuine parts benefits is key to improving after sales profits. Secondly larger fleets are less likely to run oversized loads moved with underpowered trucks to save money as in the long run as the profits are cut away by bribes and increased wear and tear on the truck. Small fleets feel they have to run the oversized load gauntlet just to have a chance of making a profit. Fleet owners are getting more sophisticated in how they run their businesses. To be profitable in India in the current climate you must be flexible, which means mixed fleets. In today’s India most freight work is door to door and the loads vary, fleets must accommodate this. Secondly large fleets are able to afford larger trucks which increases their flexibility.

There seems to be a large difference between large and small fleets in India due to the differences in profitability and the ability of large fleets to care more for their drivers. In general large fleets can afford to provide better conditions and salaries for their employees. As a result more can be demanded of the drivers. Drivers are given food allowances in order to be more productive, seatbelt use is mandatory, drinking while driving not allowed. There is more education on the dangers of drugs and alcohol as well as dangers associated with prostitutes.

In small fleets the pay and conditions are worse, and drugs and alcohol abuse are more common.

Traditionally all truck fleets in India have been small and have had to endure the problems associated with smaller operations. This has resulted in many sons of drivers not being allowed into industry by father, there is better work available for more pay closer to home. There is greater respect associated with other professions in India and the fact that you are home mean it is easier to have a family.

9.2.2.3 Truck design

India is a colourful country and that is reflected in the trucks, if the truck ambience is good you feel good. Decorations focus on ideologies, religions and the law. Trucks must have reflective stickers down the truck sides and at the back to pass registration.

The designs of the truck are left up to the driver of the truck to choose so he (women do not drive trucks) feels comfortable in the truck he drive. The theory goes: Motivation and happiness of driver = retention of drivers in a market where good drivers are in demand.
9.2.2.4  Closing points from day 1

Brokers will have a role to play in the Indian system for some time to come. This role will change as fleets play a bigger part in transit and logistics improves. In the current system brokers can get exclusive contracts with companies, a major part of their job from the customer point of view is to act as company quality control.

Market movement graph from Rahul (SIAM) MCV market growing slowest. Eicher is strongest in 7-12t segment, however this segment is the slowest growing commercial vehicle segment.

9.2.2.5  What customers expect from Eicher trucks.

Today Indian truck purchases are well informed and will not buy old (more than 2-3 years) technology or pay more for extras. They know they don’t have to as a result of competition and they cannot if they want to be profitable. Truck owners are concerned about India’s congestion so do not want overly long that cannot move in town but they do want higher load rating. Therefore trucks must be designed around their operation not what features are possible to put in the truck.

Indian drivers want a simple dash, easy operation and storage, they are away driving for many days at a time. HVAC is not something owner’s will pay for and it adds 35000rs to the cost of a truck…. Cross ply tyres still in common use as they work well in Indian conditions, however radials are becoming more common, especially on the major highways.

9.2.3  Day 2 field trip Bangalore

9.2.3.1  Nanje Gowda: Eicher truck dealership. 29th February

Nanje owns an Eicher Sales and service office in downtown Bangalore. He generally sells trucks to owners of small fleets. Typically 80% of the owner’s hire a driver, 20% drive themselves. The Eicher 11.10 and 10.90 are the bestselling trucks at the dealership. The times are changing in India, as opposed to socialist days and the past decade, you can actually get finance today. The interest rates are high at around 15% but there is more opportunity
for someone with no capital to get on the road. **Typically Eicher trucks are used for intercity middle distance freight and local work.** Trucks with less than 10t payload are bought with cab the included the benefit of this is owners can start earning money from there purchase straight away. This differs from LCV’s **greater than 10t trucks where just the chassis sold,** it makes much more economic sense to do this in long run (2years). Nanje has found that **mileage is the preference** is the most important decision making factor when purchasing a truck. The new **Eicher E2** the latest evolution of Eicher’s models has **been successful mainly due to increase payload and profitability.** Nanje is very positive towards the partnership with Volvo, he thinks it’s a good step forward for the brand.

Nanjie then went to explain the 4 most important considerations owner’s think about when purchasing a truck. They are shown I the graph above.

### 9.2.3.2 Expectations from customers

India is a harsh country, crowded and hot and dusty with crumbling infrastructure. Owners expect there **truck to be built for the country.** There is an expectation that eventually the truck will crash. As a result of this an Indian truck should be built to withstand an amount of mistreatment.

- **Expensive parts of truck must be protected.**
- **Truck’s cab front and side must be protected as this is where damage occurs.**
- **The front grill must be protected as the radiator sits behind it.**
- **The cabin must be strong.**
- **Good lighting.**
- **As a result of high competition extra features are being expected for no more coin.**
- **The truck must be productive and profitable for the owner.**
• Theft from trucks is an issue, solutions are expected.
• A roof box is needed for tarpaulin and other freight tools. It must be on the roof as tarp is heavy and the back needs to be left free.
• Storage and sleeping accommodation are important but cannot steal room from freight space or add cost. (Nanje liked the Ashok Leyland system where a bed falls down at the back of the cabin and the seats slide forward.)

9.2.3.3  Dream world options
Options which cannot be fitted for cost reasons but if there is a way to solve the problems cost affectively that these solutions fix then it should be considered.
Drivers of small trucks <10t want power steering.
Air conditioning: What solution is there to keep drivers cool without using A/c which breaks, uses fuel, costs money and needs servicing.

9.2.3.4  Other considerations
The conversation became a little erratic at this point, observations will be listed.
What does the Eicher 10.50 (the companies smallest truck 5t payload) get used for? Generally city work trucks the size of Eicher 10.50 can work outside the city but don’t. Due to their length (12-15ft) they work well among the congestion of the city carrying things like Bamboo, catering and carting water. Small trucks like 10.50 are able to be overloaded 50-60% Eicher 10.50 most preferred tray called a ‘high deck’. Drivers are aware of aerodynamics and there relation to mileage however don’t know the science behind it and use homemade deflectors.
If trucks are damaged and need repairs, they are generally done locally, cheaply and quickly. Customers like to use genuine parts when available but will then use their own mechanic. If Eicher are to be successful in aftermarket parts and servicing, everything must be made available everywhere. Downtime = profit loss
In order to increase respect for truck drivers and to entice more people to the industry, salaries are slowly increasing and owners are starting to listen/take better care of their drivers. Life is better for truck drivers on contract with companies. They have a steady income and a better chance of getting a girl. Big trucking companies and manufacturers need to help drivers become more educated especially on health, sexual health, and hygiene.

9.2.3.5  A successful Eicher needs to be
• Easy to load and unload
• Have good ground clearance
• Be comfortable for the driver. Cool cabin in motion and when stopped. (Air blowers, fans, ventilation, roof vent.) (Solar, Swamp cooler maybe)
• Have sleeping facilities (cross country trucks)
• Walk through cabs with the gear stick on the dash are liked by drivers
• Long distance trucks carry their own water and need lots of cool, clean water for driver
• Interior must have lots of storage space.
• Tarp box needs to be on the roof for convenience
• Lighting and mirrors must be optimised.

9.2.3.6    Sree logistics – owner Mr. V Srinivas

Sree logistics is the oldest logistics firm in Bangalore with a range of trucks from 8-49t. The company uses HCV Navistars on routes from Chennai to Bangalore and through Goa. The deciding factors when purchasing Navistar trucks was the up to date technology, price and lessened driver fatigue. He also said service costs and maintenance were a major deciding factor. Going further into decision factors when designing a new truck;
• Service & economics are a priority
• Durability important
• Whole life cost and high uptime important
• Trucks must feel sturdy
• Resale value important, Navistar 50% after 4 years

There are waiting times for new trucks, near new trucks can cost more than new as you get them immediately. Sree sold a 2 year old 25t Ashok Leyland for more than what he paid. The company runs 12 Navistars trucks which took over from various Ashok Leylands and older Eicher’s. The trucks are thoroughly up to date and have allowed the company to take on contract work carting cement. GPS tracking is used, the engine is slightly more powerful than competitors as it uses a 210hp engine. Trucks travel 5-10% further every day, the company has not found it hard to find drivers for the new trucks. Driver scarcity and issue but less of one with good trucks and contract work. All drivers are on company books, which
provide security for the drivers. There are many potential careers available for 10th grade graduates in India these days and trucking is not the most appealing. 

**Hub and spoke logistics model not fully implemented yet but on the way.** There is newly added pressure of bigger logistics companies increasing competition for work. **Current profit margin is 13-15% but this is decreasing.**

Eicher are weak in HCV market 1% share. They have no reputation yet. **Owners are not interested in looks** however they are proud and do want to look successful. Indians have accepted but may not necessarily be happy with the fact that all trucks will look European eventually.

### 9.2.3.7 Deepak Logistics Bangalore – Dayal Prasad

The company generally run Ashok Leyland HCV’s all are less than 2 years old. The company move vegetables on runs of up to 10000km through India. **The company purchase cowl chassis trucks and build the rest. When the company sell their trucks 2 years later, they generally sell them for a profit.**

The locally built trucks are seen as a tool for the lorry business to carry loads. This mindset influences the truck dramatically.

Dayal notes three major issues which prevent him purchasing Eicher trucks “spare parts availability, service issues and poor resale, some sturdiness issues”. **A roof box is on all the trucks.**

Dayal does not see the worth in overloading as fuel and maintenance costs increase dramatically while reliability decreases. **The company cannot get enough good drivers.** The one’s he does have drink, sleep with prostitutes and have little motivation. Encouragement to change ways including cash incentives, grog after work and even pleading reap little rewards.

Dayal feels that India roads are servicable however feels that driver discipline needs to improves as does congestion alleviation.

**In the heavy truck industry the market for factory bodies is small as they are too expensive to buy repair and take a long to fix.**
Owner’s and drivers alike prefer simple cabins, Dayal thinks A/C is bad, he thinks his driver’s will get lazier and sleep! Added features must improve productivity. Business in the truck industry is done by smart phone. Owner’s do not trust their drivers.

**Good reputations take a long time to build.**

### 9.2.3.8 Walking through the truck depot just chatting to people

Very informal interviews, Phil and I just took notes as we went along. The concensus is written here.

- Drivers need cabin space, ease of entry/exit, a bucket seat for the driver, a bench for sleeping and good visibility.
- Cabins need to be strong and take a few crashes/beatings.
- Cool cabins
- Dashboard storage
- Good mirrors

### 9.3 1st March meeting with Rahul, his projections for the future focussing on what designers must consider

Stronger cabins for drivers increase safety and reduce repair bills. Cabins will become more driver focused (driver centric) as the need to entice drivers to the industry increases and drivers can demand more from their employers. Regulations are increasing and are slowly being followed more carefully.

Greater conveniences must integrate into the design for example the roof box, rolling tarpaulin, assistance to reduce driver effort.

### 9.4 Phil & Michael thoughts for India 10-20 years into the future relating to the Trucking Industry

**Income** will have increased; the country will be at the top of its economic growth period.

**Infrastructure:** particularly road infrastructure but also depots, maintenance and loading/unloading facilities will have improved, but not to a European standard. Everything will still be as basic, simple and no frills as possible. The costs, size of the country and mentality of the people will demand it.

**Hub and Spoke delivery system:** Will be well on the way to integration. Not all will be using it but with the increased size and number of fleet companies as well as improved logistics for single truck operators, as well as increased heavy vehicle restrictions in cities this system will be a common sight on the trucking industry landscape.

**Indian Automobiles** are a good barometer for the future capabilities of Indian truck manufacturers. Without a doubt in the next 10-20 years these cars will be competing with entry level European cars. Truck development cycles are longer and less frequent but there is still great potential here. Anil our contact at
Eicher remarked that Indians are particularly skilled at adding features to vehicles for no extra cost as the market demands it.

**Population and respect for man** We feel that India’s population will continue to increase. From a ground roots level we have witnessed how important family is to Indian society and we have heard time and time again that all children born are a blessing to the family. The number of children being born into each family seems much lower than the past but at the very least Mum and Dad are being replaced. There is a sense though that the individual is expecting more of the world around him. You see this manifested in working conditions. We saw old factories and new ones and the difference is chalk and cheese, respect for life and living conditions are definitely increasing.

**Income inequality is widening** This is can be partly be blamed by corruption, the fact that money makes money and some people have absolutely none. India produces the most engineers and doctors in the world every year but there is also the issue of illiteracy. Education inequality if that is a term is huge, and has become a barrier to entry into truck driving. New regulations require a minimum 10th grade pass from high school the equivalent to Högstadiet.

**Outsourcing and Exporting** Someone in India has seen the writing on the wall and has informed the country that the boom the country is experiencing is only a temporary thing. Everyone we have spoken to has expressed the need to prepare for after the boom. Indian companies are already investing in Africa in preparation for when labour is too expensive on the subcontinent. Indian companies are also preparing for market saturation in India. In the next 10-15 years you may find Indian trucks competing as the value alternative in developed markets or the first alternative in developing markets in Africa, Asia as well the gulf.

**Government corruption and transparency** Is a major issue in India. When a Politian is elected to office it is not long before he also becomes a very rich man. Changes are being man and recently Mahumat Singh (check name and title) initiated efforts to develop a corruption ombudsman and office. Corruption will take a long time to bring under control as it is a part of life in India. Police corruption is rampant; 200rs generally buys your innocence for petty crimes and traffic offences.

Changes are happening though and you get a sense that they will be as swift as possible as the public want for such changes is palpable. Public examples of how corruption is being tackled include all products being stamped with their retail price at the factory and a law which tackles tax evasion whereby if no receipt is produced after purchase of a product no payment is necessary.

**Government regulations and legislation** Are getting stricter and more rigidly followed and enforced. The beauty of India is that there is room for commonsense and room to just get things done. In 2020+ there is still going to be an element of rule bending, ambiguity and turning a blind eye, but much less. Emissions, safety, loading and state crossing registrations laws seem to be the major areas where change is happening and happening seriously. The interesting thing is Drivers and owners are taking the laws seriously and do
seem to have some intention of following the law. They do seem to think they are for the good of all.

**Less truck drivers** As discussed earlier there will be less availability of truck drivers. New laws demand all truckies have a 10\textsuperscript{th} pass from school. The problem with this is 10\textsuperscript{th} pass school leavers have so much choice in what job they want and frankly there are easier, better paying jobs closer to home. If the industry is to have enough men behind the wheel then working conditions, pay, driver rights and the appeal and respect which are associated with the job must be improved.

**Consolidation** The trucking industry is getting more and more competitive every day. In order for companies to make money economies of scale come into play. It can be inferred that in 2020+ there will be many more big players and the smallest players will probably share logistics networks or be linked in some form of industry organisation to allow them to compete as a united force against the big boys. Look to Europe to see what may happen as the same thing happened in the 20\textsuperscript{th} century.

Consolidation may also occur in the truck manufacturing sector as currently there are many domestic truck brands and joint vehicles being set up at the moment. India is a big country with 1.2 billion people but still you get the feeling that consolidation will arise as the market reaches maturity. There a number of companies with extremely deep pockets who will have the ability to make this happen. The most obvious example would be Tata.

**Increased utilisation of trucks** Currently the average Indian truck on the road drives less than 100,000 km per year which is low for a truck. Slow roads, insecurity of a return load, fuel economy, inefficient loading and unloading processes affect the utilisation. By 2020 these issues will still prevent trucks utilisation reaching western world levels but there effect will be less.

**Time and business** ‘India time’ is not the same as European time it is much more flexible. Meetings start up to 15mins before they should or maybe 30mins after the start date. They may be broken up as meeting participants come and go. Nothing is really private in India, anyone is welcome to come and listen in on a meeting and more information that should be is public knowledge. When it comes to trucks at present they turn up when they arrive and leave when they leave. In 2020+ trucks will still be running on India time as there are too many factors affecting punctuality however accurate prediction of arrivals, travel times and departures will be better. There is a desire for more reliable and efficient road transport and road freight providers are trying to ensure this by running only new trucks, sticking to servicing schedules and using technology such as GPS to track trucks.

### 9.5 Day 1 visit to Indore Anil Bajpai 5\textsuperscript{th} March

We started the interview with a little background information on India, Indore and Eicher. India is a country with a **huge divide in the standard of living**, this can especially be seen in Indore. **Indore is a city with a high growth rate** and a lot of money being made very quickly. **It is a manufacturing hub**,
however other companies such as ‘Infosys’ are setting up there as well. Big companies in Indore include MANforce, Eicher, Force and Bridgestone. Eicher which is located near Eicher in Pithampur was set up 60 years ago as ‘GoodEarth’ making tractors. In **1986 the company started building trucks in partnership with Mitsubishi** with the first truck rolling off the line in 1989. In 2004 Eicher sold their tractor business along with the rights to brand tractors ‘Eicher’. 2008 saw a JV joint venture between between Volvo and Eicher begin.

Recently the company released and update of their trucks, the ‘E2’ series truck which is a very basic update. The company **first started building low and medium duty trucks** and have since expanded into heavy vehicles. The company have done well in the medium duty vehicle market **winning 31% market share.** Due to Eicher being a relative newcomer to the **HCV market they only comprise of 1% of total market share.** The big players Tata and Ashok Leyland dominate the market. **The company has a truck in every category** from LCV to HCV in is very proud of that. The Indian truck market is driven by one thing, maximising value for money. Eicher try to adapt to this and market their trucks on value for money. **Mileage ka badshah** translates to “king of fuel economy”

(http://pics.livejournal.com/eicher1110/pic/00002sry)

On the negative side of the Eicher **brand Anil became a little defensive when we brought up the topic of resale value.** He defended it saying resale was ok and that 70 out of 100 customers were happy with it however if you read his body language you got the sense it was something the company was struggling to deal with. The heavy duty market is growing however it is growing slowly, the company feel that they have a lot of **work cut out in front of them until at least 2015(HCV segment).** The company is hoping and do believe that customers see the **Volvo partnership as extremely beneficial** to the reputation of the company.
9.5.1 What do customers want?

- A profitable truck.
- A truck exactly suited to their needs, Eicher therefore try to be as flexible as possible.

After viewing data from SIAM the Society of Indian Automobile Manufacturers in Bangalore we questioned Anil on Eicher’s plans when trends in the Indian market see the HCV and LCV growing strongly and the MCV market growing much slower. Anil was quite coy when he answered especially when questioned on the potential of a <5t truck being released into the market. When talking about the driver however Anil was keen to stress the increased importance of the driver when deciding on features for the truck. Owner’s don’t really care about the driver but do need a driver and the shortage is increasing so enticements are increasing. He qualified his statement by saying that drivers chase money and it is the most important workplace decision factor. Anil does not think that better looking trucks will increase driver image. While customers say they are not interested in looks Anil did talk about ‘a curvier truck’ that sold better than its predecessor which the company did put down to better looks as they were essentially the same truck. (Do not know which one). Anil went further to say that owners are very proud of their trucks and want to have one which looks expensive.

What’s the appeal of an Eicher truck? They do cost more but the company pioneered the LMD segment in India so they have a very good reputation. How are the trucks evolving? Anils example revolved around interior features. In the past there were no radios or fans. Now there is a provision for them and in the next 10 years there Air conditioning is likely to become an option in Eicher trucks. Safety is still not an important factor yet safety goes as far as telling drivers “not to crash” and then telling them to drive and “learn on the road”.

Trucks are being used slightly differently these days and this changing trend is set to continue. Loading is slowly becoming more automated however manual loading is still the major loading process. Rules are still not necessarily followed, a 7-8t truck will still be loaded with 15t of goods. Road infrastructure is getting better but that is relative to the terrible state it is in today. Rural areas are still difficult to freight goods to. Even though diesel is subsidised and government is keen to expand the road freight industry fuel economy is still the major decision factor when purchasing a truck however with a better road network and increased speeds, more power from the trucks will be needed in the future.

Who buys the trucks? Mainly private or small fleet owner’s. Large fleets are increasing however Anil does not feel like they will make a large presence for a long time to come.
9.6 Day 2 visit to Indore Anil Bajpai 6th March

9.6.1 Truck depot Indore

We started the day at the depot just walking around and talking to drivers and finding about what they did. We talked to a truck owner named Ganesh he has a fleet of mainly Tata 1109 and Eicher MCV trucks. He also has a Tata Ace and a few larger trucks for flexibility. Ganesh carts mainly beer and wine, he does not drive anymore, he has drivers who work for him and he seems to have a very good rapport with them. He looks after the drivers if they work well by paying for prostitutes or buying them drinks after work. Ganesh himself says that they enjoy their work, however he did admit that it is hard to find enough drivers.

Ganesh thinks the Tata’s are better trucks as they are nicer to drive as they drive like a car. When asked about his Eicher trucks Ganesh said the cabins are comfortable for the drivers and generally his experience has been good. The trucks have good grip and are well built however at speed the bigger Eichers in his fleet shake which is very uncomfortable for the driver. His drivers are away for long times and do have to sleep in the truck or on the truck. All his trucks have roof boxes for storage. Sometimes his drivers even sleep up in them.

Talking specifically about the trucks Ganesh buys both genuine and aftermarket parts however he is extremely careful about what local parts are used. He likes the flexibility a local body builder gives him however most of his trucks are MCV’s with steel bodies. He wants his drivers to be happy driving so he allows them to have the trucks painted how they want it. Eye stickers predominant on many trucks are just for decoration. When asked if he would buy a nicer looking truck Ganesh replied no it would be cheaper for him to have the truck made ‘pretty’ by someone else after purchase and he can have it look how he wants then. Ganesh overloads his trucks almost to double the payload, he does not have to pay many bribes to get away with this.
We then talked to some of the drivers at the depot. They talked about their routes, the rapid growth of the industry and how they decorate the trucks. **Drivers think about safety and like to paint their trucks brightly to be seen.** They also like putting glowing stickers on their trucks. One truck driver said because of the nature of the work the truck becomes the bride and the driver must make his bride beautiful. They like decorating there trucks and want a blank canvas. European trucks look ‘soft’. **The drivers want a cabin that is customisable and easy to fix because it will be constantly damaged.**

9.6.2 SR Roadways - Baggat Singh

Baggat runs HCV trucks over longer distance routes. The most common truck he has is the Tata 3118 cowl chassis truck. **“Bad road conditions call for strength, factory built bodies do not have this.”** Cowl chassis trucks are cheaper to build and easier to fix when damage occurs and it commonly does. Baggat transports medicine, vegetables in open back trucks and machinery. The average trip for Baggats company is 2200km, **he will run his trucks for a maximum of 3 to 4 years any longer and the trucks become unprofitable.**

Baggat is proud of the success his company has enjoyed and the professional nature of the company and wants that reflected in the truck however he stressed that function is still the most important thing. Upon asking him what his drivers thought of the trucks they drove he answered that “drivers are not trained or educated enough to make suggestions.”

When asked about his strategies for finding drivers Baggat explained that there was a driver shortage as the conditions were not good, however he had **luck finding drivers by going to training schools directly and recruiting.** When asked what drivers want from him he said a new reliable truck was the most important thing.

The truck industry today and trends Baggat has noticed include;

- **The introduction of the hub and spoke system**
• Increased competition from large logistics firms especially on the long distance highway routes
• Profits squeezed due to more competition
• Increased difficulties running large fleets due to a lack of drivers but in 10-15 years fleet size will have to majorly increase in size to be profitable due to competition.
• A reduction in the amount of trucks being overloaded
• A movement towards factory built cabins
• Average truck speeds are increasing with better roads, this also brings freight breakages and maintenance costs down, however trucks will need more power in the future
• Refrigeration is not popular and he hasn’t seen any changes to these trends

Personally Baggat has limited his company to 70 trucks, he feels it is a good number for the size of the city and the company’s ability to find drivers. Indore has 3,272,335 inhabitants (State Census, 2011). He stopped overloading his trucks 3-4 years ago due to increased restrictions and fines and higher maintenance costs. While cross ply tyres are preferred across India he prefers radials especially on the highway. Baggat finds it more economical in the long run to use genuine parts.

On truck selection: Baggat has used Eicher trucks in his fleet. The companies trialled a few Eicher 10 wheeler trucks and were disappointed. SR Roadways experienced high maintenance costs, engines failures and bad body strength from the steel cabs. The company have since returned to running cowl chassis trucks with locally built bodies. The life of a truck at SR begins when it is newly purchased from the manufacturers on finance, the truck is used until the loan for the truck is paid off and then it is sold on for a profit. Tata is the preferred truck for the company as it has the highest resale value. The company first started using Tata trucks when it opened in 1981, at the time they were the only option. Since then the company has had good experiences with Tata due to their reliability and resale value. Fuel consumption is the largest running cost concern. Drivers prefer Tata as the majority of them learnt to drive trucks behind the wheel of a Tata. Bagat does want his drivers to be comfortable as it improves profitability, he allows them to customise the interior of their trucks as well as ‘small things’ on the exterior.

When the companies trucks are loaded it is done manually, only heavy products are loaded by crane. Containers are not used as they are costly. The success of his company has come from working hard, being reliable and getting contract work (Coca Cola).

The most common areas of damage to the truck are the front lower part of the cabin, the bumper and grill. Most accidents happen when the driver falls
asleep, **many of his drivers still drink and drive** even though he implores them not to.

Final thoughts from Baggat. **Indians are proud of being Indian show that in the truck!** Big fleets must have different sized trucks for flexibility.

### 9.7 Interview transcripts

#### 9.7.1 Questions and Answers: with Nanje Gowda - Eicher dealer

**Talking in general about trucks and about the impact of the scarcity of drivers.**

Mainly selling medium goods vehicles
Many of the trucks will be driven by somebody different to the driver
11,10,10.90 most popular
Often need a loan to buy, this through external finance institution.

Main use of truck?
Market loads in the city of contract work via brokers

Work done where?
Mainly intercity, like chennai to Bangalore
Some interstate work but that would require a larger truck.

Is the cab fully built when people buy the truck?
Many customers like the cab yes, especially for trucks under 10 t. It allows the owner instant utilisation. They cannot afford to wait.
Hd trucks, mainly just the chassis Is bought
Body builders have a flexibility and can be application specific, cheaper too

Factory or body builder, peoples general thinking?
If you use a body builder you can replace parts easier and cheaper, using wood as a panel material gives you a cooler truck.
Is this really true?

Has the e2 xp been a good seller? Jv truck with Volvo
Yes, it has good payload mileage and engine.

Buying process, what do people look for?
Mileage and capacity first, maybe comfort if the buyer is the driver

Trends in purchasing?
Mileage is always key, comfort and styling are much further down the ladder.
Resale value is a large factor.
This is hurting eicher a bit as they do not have a high resale value
In general tata, especially the hd trucks, have a really good resale value. Bigger trucks are now getting more axles so they can carry more, so better resale as they are good for a business.

What are the commonly requested features for you trucks?
Bumpers to protect the radiator, fan and engine as these are expensive parts.
Strong cabin and body
Good headlamps

Have you noticed some features that have become more of a demand than a desire?
Yes, things that other trucks, like Tatas have.

What is the (homemade) box on the roof used for?
Tarps, rope, lockable for storage.
Customers like a flat roofed cabin so they can easily build a box and get ventilation in. Even though a built up deflector would be more aerodynamic. As theft of stuff is an issue, this box is lockable.

Sleeping in the truck?
Common on md and hd trucks, not ld. Some form of bed bench or fold down thing would be good

Have any features from the automobile industry crept in?
Yes, on heavier trucks people would like power steering. Ac of course but that is too expensive, generally.

use of the smaller trucks?
Catering, market loads, vessels, event management
They are nimble in the city. This is mainly the 10.50 the 3 t Pay load can be overloaded to 5.

Payload area?
Low deck and cage, customisable, application specific. Allows overloading

Modification for aerodynamics, we have seen home brew deflectors.
Yes, aware of aerodynamics in a general way, but not the specifics. They are trying to solve a problem but are not quite sure how.

How do repairs work?
Local guys are cheap and fast, good for maintainence parts but the lifetime isn't there.
Any mechanical damage (drivetrain) usually goes back to eicher
Genuine parts are of course better but more expensive. Awareness of oem parts is important.
Mobile service station every 200 km on the main highways and centralised repair dossiers so you know what is going on for a certain truck.

Gender split?
There are no women in trucking as it is not safe nor do they appreciate the lifestyle.
These days, as cost of living rises, both the husband and wife need to work, but the profession of truck driver is not good.
As the scarcity of drivers increases, and if we can guarantee a good life, then maybe we will see some female drivers, but the society needs a big change first.

How could the lifestyle change?
Listen more to the driver, but the driver has to know what it could be.
When the new logistics companies popping up gain more traction
Companies with a high csr can help educate and protect drivers.
Get rid of the bad habits
Eicher offer an education package about driving, truck specifics, hygiene and disease

Truck damage?
Happens sure, sometimes due to sleep, drowsiness or drunkenness, or just an accident. Usually to the front, the door hinges and sometimes the chassis.

Nighttime?
Sleeping is very important to consider. They sleep in the truck, or if hot out, on it or under it.

Are there any alternative to Ac?
Air blowers, hatches, fans

Any general tips or things to think about, focussing on the driver?
Storage, respect, availability of cold and clean water, good lights
Storage for food and cooking things, sleeping space. New ashoks have a dash mounted shifter, so the floor is free. Walk through cabin.

9.7.2 Questions and Answers: with v. Srinivas Owner of sree varamahalakshmi roadways

Runs he trucks, mainly with cement or odc. Has just bought 12 new mahindra navistar trucks. He has a flexibility of fleet, can carry between 8 and 49 tons,

Why the new navistar?
Improved technology and price point
Used for?
Mainly cement from Somewhere to Somewhere else. But other things by contract.

Before the navistars?
Had Astok leyland and eichers

The new navistars have been a good investment though, as there is less driver fatigue. But no Ac.

What is good about the new tech in the truck?
They are sturdy and comfortable to drive
Good mileage and the new trucks can carry more than the old ones.

What do you feel about the look of the truck, it departs drastically form what has come before.
Looks good

How do you run your trucks?
1 driver and 1 helper, provisions for both. Has middle seat and double sleeper type cabins.

Has had a crash because of drowsiness, the under chassis was damaged but this was an easy fix. He did not comment on the condition of the driver.

Have you noticed the scarcity of drivers?
No, not really.

Has that got to do with the truck?
Sure, drivers like it, we have seen a 5-10% increase in productivity.

An average trip is 300 km at 50-60 kmh, 10h going and 8 back as the truck is empty. About 6000 km per month.

You drive them back empty, isn't that costly?
We have enough work, it is better to get them. Home and reloaded.

How do you train your drivers?
Navistar has a training program so they learn about economical driving and truck functions etc.

I general it is a very durable and sturdy truck. Resale is of course important, not sure what it will be for these. Should be around 80% of the initial cost.

How has the hub and spoke model effect you and your company?
It has not really been implemented yet, so it is a little to early to tell, but it seems good on paper as the big trucks just can't get through the city. That and the big logistics companies are going to effect things, but not sure how.

9.7.3 Questions and Answers: with Dayal Prasad - Deepak Roadways

Has been buying leyland truck since 77 for there reputation and their relationship and there familiarity. Keeps a truck for two years then sells it on, keeping the fleet new, Carries veg,

Buys cowl and chassis type, body is built by them. Strip work, then metal clad wood. Does not need decoration, is not a bus. Is just a tool he says.

Did you consider buying an eicher?
No.
Parts are not available when you need them. Service is bad.
Resale value is bad.

Why do you choose to build your own cabs?
Cost, can make it specific to needs.
No though is given the design in a traditional seance or the comfort. It is a box. There is a box on the roof for tarps and stuff.

Are your drivers on contract or payroll?
Mix

Have you noticed the scarcity or drivers?
Yes, it is very hard to find good drivers. Quality and discipline are hard to come by. Knows of the industry in Canada, huge difference there. Much different lifestyle as a trucker in India, to Canada.

New companies are making it harder to give a decent salary, profit margin small.

Why do you think there is a lack of discipline?
Not because they are Indian, but because of India, the traffic, the roads, the population the congestion make it’s difficult job.

Talking about truck design and features.
Simple is best
Comfortable is not important
No need for design
If you put Ac in, they will just sleep in there all day. No discipline.
Features should be such that they improve productivity and not be abused. It is hard to know what drivers are up to on long trips and there for it is hard to trust them.

The problem of a driver shortage is new to him, no suggestions on how it can change.

A tool is a tool.

9.7.4 Questions and Answers: with Anil Bajpai - Product planning, eicher

Indian customers want reliability, serviceability, durability. But they do not want to pay too much for it.
At eicher, they focus on fuel efficiency, mileage is king,

How do you see eicher’s resale value?
Ok enough, maybe people choose not to buy the trucks for other reasons

How are sales going?
Goo throughout the country, mainly medium duty trucks but they are seeing better figures on the hd side

What have you noticed since Volvo came into the picture?
Change for the better on the he side, people know of Volvo and the Volvo market. There has not been an image change in the Lmd segment though. It does not matter who. The joint venture is with, the customer wants a truck that will give him profit.

Do customer look to the Volvo and expect the same things for m the eicher?
Yes, is sense, but they do not want to pay for it.

Does eicher design it's trucks around the hub and spoke model?
they design for both the highways and the city, but there are some limits, a hd truck would have trouble in the city.
They have to design for the conditions

Looking at market projections, the md market is shrinking, change in plans for this?
Yes, it is necessary

In the future, new direction?
Things will change as the industry grows. There will be a shift to focus on the driver. Right now the press for profit is exploiting the driver. The currant breed of driver is accepting of this, but these guys are becoming scarce.
Future purchases could be based on driver preferences and then there will be a greater focus on features.
Do customers care about the looks?
Yes, of course. The curved front of an eicher was totally unique when it came out. Eicher helped make the ld market and at the time the truck was looking good.
This is of course based on prior experience,

Features in the future?
In the past nothing was standards, no air blowers, no radio. These days they are. More and more features will go from desire to option to expected.

Is there really a driver shortage?
The drivers want a well paying job with a good working environment. The drivers are not seen to be good at making choices due to a low education, They may try to influence truck purchase though

Will a good truck attract driver?
Do not know, hard to say

Do you see a trend in current logistics?
There are big customers, but many have just one or two trucks. Don't think that this will effect drivers too much. Trucks are built for a market reason, a need. They are a tool first, not bought on frivolity or emotional values.
There is still room for specialised fleets

Could Indian logistics be heading towards the European model?
Maybe in parts, not sure.

Will the imagine, reputation, of the truck effect the image, reputation, of the driver?
No, the driver is always just a driver, if he is the owner, then there is a difference. The image of the driver will not change for a long time, is ingrained in people's minds. All this despite the truck.

Has there, will there be much change in on and off loading?
Manual is still the norm. If certain companies can afford machines and tool then they will be used. Forklifts for example.

On rule breaking (speeding, overloading, etc)
It is still cheaper to pay the occasional penalty or bribe than to lose the extra profit of running an overloaded truck.

Trend in improvement of road system and infrastructure in recent years?
There has been a big improvement and there will be more in the next 10 years. We will be able to drive faster and more safely and utilise Last Mile Connectivity with the help of the hub and spoke model.
Does the trucking industry have much to do with the government, pushing infrastructure etc?
Government is thinking about trucks as they represent such a large part of the GDP. They subsidise diesel, for example. So there is no real need to lobby.

Will the infrastructure affect the trucks?
Yes, we have to design for the conditions. Right now slow roads mean that trucks don't need much power, so they don't have it. Faster roads will mean faster trucks that need to be safer and have bigger engines. There also has to be innovation with consideration to the competition.

On 10th pass need?
Could hamper the industry, as it is difficult to get that level, especially retroactively. Education will improve respect though, this is seen everywhere. How can you ask for respect without an education?