

# EXECUTIVE SUMMARY

## 1 INTRODUCTION

1.1 Department of Scientific & Industrial Research has been commissioning studies on technology status in different industries and assigned the Technology Study in LCV Industry to M M Suri and Associates Private Ltd. (MMSA).

1.2 For carrying out the study the following units were visited for discussions with the managerial and technical personnel (specially R & D) of the various manufacturers. Prior to the visit a guide on points for discussion had been circulated. MMSA also contacted major ancillary manufacturers as also ARAI. Visits covered the following :-

LCV manufacturer visited	8
Ancillary Manufacturers covered	13

## 2 PROFILE OF THE LCV INDUSTRY

2.1 The details of production of LCV's in the last 10 years has been as under:-

### LCV PRODUCTION IN LAST 10 YEARS

YEAR	PRODUCTION [NUMBERS]	NO. OF UNITS
1977	7936	5
1978	11557	5
1979	14182	5
1980	20415	5
1981	24518	5
1982	28853	5
1983	27245	5
1984	32893	5
1985	35122	9
1986	38297	10
1987	43427	9
1988	47201	10
1989	45479	11

2.2 The initial manufacture of commercial vehicles during 1948—50 was mainly LCV (11683 LVC's against 764 trucks). Over the years the production of trucks increased at a much faster rate compared to LCV's and by 2nd half of sixties, the truck production was almost 4 times the LCV production (113911 trucks against 29161 LCV's during 1966—70). Thereafter, the LCV production grew at a faster rate and by 1986 it had crossed the truck production (38297 LCV's against 36060 trucks).

2.3 Currently 11 manufacturers are producing LCV's. In view of the Government decision to allow broad banding of the automotive industry, all four wheeled automotive vehicles have been broad banded in January 1985. Therefore, separate Licensed Capacity is not available, however the production of LCV manufacturers in 1989 has been given below.

**PRODUCTION OF INDIVIDUAL MANUFACTURERS IN 1989**

	<b>Figures in Number</b>
Ashok Leyland	67
Mahindra Nissan	2192
Bajaj Tempo	16080
DCM Toyota	3288
Eicher Motors	4328
Mahindra & Mahindra	4630
Standard Motors	32
Swaraj Mazda	3417
TELCO	10831
Premier	2
Hindustan Motors (DA & Trekkar)	612
	45479

2.4 The initial manufacturers HM & Premier are not producing LCV's at present. Bajaj and M & M who started production in mid fifties and Standard who started production in sixties are still in the field. Out of four new comers with Japanese collaboration, DCM Toyota, Eicher & Swaraj are gradually increasing production. The 4th unit, Allwyn had closed down and has restarted as Mahindra Nissan Ltd. Telco who entered into this field in 1985 with own designed vehicles are growing at a fast rate. At present (1989) Bajaj Tempo are the leaders with 35% of the market followed by Telco 24% and M & M 10%.

- 2.5 All manufacturers excepting Telco had taken up manufacture of LCV's with foreign collaboration. Telco had developed their own designs for the LCV's including the engine. During the eighties when the older manufacturers Bajaj Tempo and M & M decided to modernise their vehicles; they entered into fresh collaborations for the engines. Bajaj have also imported technology for a new LCV's Traveller.
- 2.6 The new manufacturers with Japanese collaboration are still in the process of completing indigenisation upto the required level and have not yet taken up any modifications other than minor changes on the basis of market feed back. They have reached 50-60% indigenisation (1988) and expect to reach the specified level of 95% within 5 years.

### **3 TECHNOLOGY STATUS - INDIVIDUAL MANUFACTURERS**

#### **3.1 Bajaj Tempo**

- (i) This company, founded in 1958, commenced production with totally imported technology in respect of product design as well as production techniques. Both product designs and plant for production were obsolete with the collaborators when they were transferred, and initially supervisory skills through some foreign technician were also made available for installation, operation and maintaining of continuity in production. From a small volume of 400 nos. per year, the company has grown to a production volume of 16,000 nos. per year. Engineering effort has been mostly confined to establishment of indigenous production of all the components and expansion of capacity. Deviation from original imported designs were mostly to meet the market requirements for various applications which involved minor changes to chassis dimensions. Need to use indigenously available raw materials in place of originally specified ones also led to some developmental activity.
- (ii) However, when in 1984 the Government decided to permit new collaborations in order to intensify modernisation and competition, the management found it necessary to import new technology in respect of the engines only to maintain their share of the market. Even now attempts are not evident to modernise other assemblies such as transmission, steering, braking, suspension,

or even body styling, as changes in these aspects are not necessary to maintain the market share and also can lead to price increases which will effect acceptability by the buyer.

- (iii) Technology in respect of a new engine, a 4 cylinder IDI engine of 4500 rpm from Mercedes Benz is now being absorbed for production. This engine has a potential for use in other applications including a medium sized diesel engined car, if and when the Government approves manufacture of such car.
- (iv) Technology has also been imported by them for manufacture of a new model known as "Traveller", used for transport of persons. The vehicle has a unitary construction ("MONOCOQUE") in which body and chassis are integrated as one structure. The welding of joints is a critical operation in such a construction and, failure of joints can lead to vehicle damage. Hence, the company has found it necessary to import the techniques by payment of technology fees and royalty.
- (v) The company has been the leading manufacturer of LCV's for many years and has also a well established R & D. However, when need was felt for having a better product, to meet the challenge of the new LCV's with Japanese collaboration ; the company did not have confidence in their ability to design a suitable engine and entered into fresh collaboration for a new engine.

### **3.2 Mahindra & Mahindra**

- (i) The company commenced production of Jeeps in 1950 with technical collaboration from M/s. American Motors Corporation, USA and enjoy the same even today, a near monopoly situation in the field. As part of diversification, a small 1 tonner LCV was developed and introduced by the company in mid fifties, using the same power train assembly as the Jeep. Apart from the Jeep and the 1 tonner vehicle, no other heavier models in the LCV range have been attempted so far, mainly for want of suitable engine. Until 1987, the diesel engine used was common to the vehicle range, as well as the tractors manufactured by the company.
- (ii) During the late seventies M & M were on the look out for ways

and means to modernise their products. In 1980 they entered into a collaboration with Peugeot of France for an IDI engine of higher speed and power. Initially, the new engine was fitted to meet the requirements of exports to Middle East countries, but recently, as production volumes increased, they are used for sale in the domestic market also.

- (iii) Notwithstanding the import of new technology for a modern engine, the company has also undertaken development work on their own to improve the performance of their original diesel engine through :-
  - (a) Indigenous effort in collaboration with Automotive Research Association of India, and
  - (b) A developmental contract on AVL Ltd., in Austria, a world renowned engine design specialist firm.
- (iv) The above development efforts have produced good results and have considerably improved the performance of the original diesel engine. 2 cylinder, 3 cylinder and 4 cylinder versions of this engine are being developed for use in different models of tractors. The new engine though much better than the original engine was not considered good enough when compared to the newer engines being used by the competitors in LCV's. The company, therefore, resorted to import of technology for a 'State of Art' Engine from Peugeot in order to remain competitive. This technology has been assimilated and the engine is in regular production.
- (v) The company has recently built a well equipped R & D centre at Nasik and has built up capacity for absorption as well as development of new technology. The R & D department of the company has carried out successfully the design and development of power train assemblies to match the Peugeot engine fitted in their vehicles, as also designs of new bodies for various applications.

### **3.3. Standard Motors Products of India**

- (i) This company was originally set up in 1952, for the main purpose

of manufacturing cars and did not manufacture any other product until 1965. After emerging from a long spell of closure due to labour problems, they found that the company can no longer sell cars competitively and survive, and therefore, developed and introduced a 1 to 1.5 tonne LCV. The technology was totally imported from M/s. Austin Rover of UK, and as in the case of the other two manufacturers, only marginal changes to suit individual applications were attempted through indigenous effort. In addition, they obtained design for Rover 2000 car.

- (ii) The R & D department of the company is small in comparison with other manufacturers and is fully committed to trouble shooting work of the Rover 2000 car in the market and some body development. The equipment available for R & D needs to be strengthened.
- (iii) An exercise for updating the IDI engine fitted in their LCV by converting it into a DI version and by turbocharging was carried out as a sponsored project through the ARAI, but the engine has not been put in the market yet. At present, the company is going through a very difficult time financially, and it remains to be seen whether they will recover their strength sufficiently to advance their development and production capabilities.

### **3.4 Tata Engineering & Locomotive Co. Ltd.**

- (i) As the largest manufacturer in the Indian Automotive Industry, they have built up a very strong R & D and production base and are comparable to many manufacturers in advanced countries. Although a new comer to the LCV market since 1986, they have a complete range of models from 2 tonnes to 6 tonnes GVW, developed and put in production through completely indigenous efforts.
- (ii) They use modern techniques for design such as Computer Aided Design, modern evaluation techniques for laboratory testing of fatigue in components, and have built up a comprehensive data base for their work. Facilities for machining, forming, painting and finishing are as modern as can be found in plants of similar size abroad.

- (iii) It can be categorically stated that they are a shining example of what Indian efforts can achieve in technological competence, given the will and the resources. In the Indian market their models are proving comparable in performance to all the new models of Japanese origin recently brought in.

### **3.5 New Entrants**

- (i) Allwyn Nissan Ltd. which started production in 1985 with Nissan collaboration had closed down and has been restarted as Mahindra Nissan Ltd. after being taken over by M & M.
- (ii) DCM Toyota Ltd. and Swaraj Mazda Ltd. started production in 1985 and Eicher Motors Ltd. in 1986. All three units are in the process of absorbing technology and indigenising components. The absorption of technology is progressing smoothly. During absorption, certain number of changes have been made to adapt technology to Indian conditions. However, it is premature to talk of technology improvements at this stage. The R & D set ups are limited and mainly look after indigenising of imported components and changes to suit Indian conditions.

### **3.6 Ancillary Manufacturers**

Many of the ancillary manufacturers have developed capacity to meet the demand for better components, by own developments or by fresh collaborations. They are also prepared to develop and market further improved design of components in case there is sufficient demand. Here it is necessary for LCV manufacturers to give the lead.

## **4 TECHNOLOGY STATUS - VEHICLES**

- 4.1 With the introduction of new Japanese vehicles and upgradation/new design by existing manufacturers, most of the present LCVs are comparable with those available in the world. However, with the lone exception of Telco, other manufacturers have still not developed capability for introduction of new improved design of vehicles and engines. Bajaj, M & M and SMPI had brought out LCVs with different bodies using their available engines.

- 4.2 The R & D set up of the new manufacturers needs to be strengthened considerably to enable them to keep up with world developments. The licensing of four new units simultaneously has affected the ability of the manufacturers to reach reasonable level of production due to limited market for LCVs. This has also limited the resources which can be allocated by them for R & D.
- 4.3 The HP development by the engines of various LCVs is between 20 - 30 HP/1000 CC. The world figures are also around 30 HP/ 1000 CC.
- 4.4 The power per ton of GVW is between 12.3 - 17.3 HP and compares with usual power of 15-20 HP/ton of GVW provided in the world.
- 4.5 The ratio of payload to GVW varies between 0.53 to 0.62 and is comparable with that available in International vehicles.
- 4.6 As stated most of the Indian vehicles have the latest features available in the world. However, it is necessary to carry on with the developments in various areas to keep with future world developments. In engines, the following factors have become design objectives:-

Specific output - 1 HP for less than 2 Kg. of engine wt.

Specific fuel consumption - 150 gms/BHP hour

HP/1000 CC - 35 - 40/litre of swept volume

Minimum servicing and maintenance requirement

Indian manufacturers must also work to these targets.

## **5. RESEARCH & DEVELOPMENT**

- 5.1 All the LCV manufacturers have set up their own R & D organisations. The expenditure on R & D is however quite low, being around 1% of the turnover against 3-5% of turnover for good manufacturers in the world.
- 5.2 The Automotive Research Association of India has most up to date facilities for research and has the necessary expertise and experience to help the vehicle manufacturers for R & D in specific areas, outside the range of the manufacturers own R & D.



5.3 VRDE nodal agency for Defence automotive vehicles has very good testing facilities for vehicles and components. These test facilities are also available to private sector.

5.4 Various IITs, IISc Bangalore and engineering institutions have well equipped laboratories and have qualified personnel. They can assist vehicle manufacturers in specific projects.

## **6 RECOMMENDATIONS**

6.1 Indian manufacturers should earmark larger resources for R & D. Their present level of R & D expenditure is 1 - 1.4% of turnover against 3 - 5% by good manufacturers in the world.

6.2 Vehicles manufacturers should take action to optimise the performance of their vehicles in the following areas :-

- (i) Better power wt. ratio for engines
- (ii) Higher power/unit volume
- (iii) Improved fuel consumption
- (iv) Reducing exhaust and noise pollution
- (v) Improving pay load to GVW ratio
- (vi) Reduced maintenance

6.3 Government should encourage indigenous R & D by fiscal measures such as :-

- (i) Grant of soft loan/subsidy for R & D to approved R & D projects of national importance e.g. fuel efficiency, use of ceramics, pollution control.
- (ii) Weighted deduction for approved R & D expenditure.
- (iii) Excise relief on products based on approved indigenous R&D.

6.4 In view of the limited LCV market, and eleven manufacturers being already in the field; additional licensing of manufacturers should be considered very carefully.

6.5 Government may consider sponsoring R & D in areas of common interest e.g.

Exhaust pollution

Noise

Better materials

Improved components life

Better fuels