PROJECT PROFILE

ON

AUTOMOBILE LEAF SPRINGS

Month & Year
December 2009

PREPARED BY

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AUTOMOBILE LEAF SPRINGS

A. INTRODUCTION

Automobile leaf spring is one of the most important component in an automobile vehicle. Springs are placed between the road wheels and the body in an automobile, when wheel comes across a bump on the road it rises and deflects the spring, thereby storing energy therein. On releasing, due to the elasticity of the spring material, it rebounds thereby expending the stored energy. In this way the spring starts vibrating with amplitude decreasing gradually on account of internal friction of the spring material and friction of the suspension joints, till vibrations die down. The demand for automobile leaf springs is increasing as there is O.E. market and Replacement market for these items as they are frequently replaced.

B. PRODUCT USES AND SPECIFICATIONS

A Leaf spring generally consists of 4 to 21 leaves including the main leaf or mother plate. The length of the main leaf varies from 650 mm to 1550 mm between the centres of the two eyes. The width of the leaves varies from 35 mm to 75 mm while the thickness varies from 5 mm to 12 mm. The main leaf is formed into eyes at the ends to support the shackle pins where as the other leaves are flat and are arranged in descending order of length to provide proper spring action. The leaves are bolted together in the middle by a centre

bolt and clamps are fitted suitable intervals to hold the leaves in proper position.

Bureau of Indian Standards has prescribed necessary standards under IS-1135 for Automobile Leaf Springs

C. MARKET POTENTIAL

There are two types of demand for Leaf springs 1.O.E.Demand and 2.Replacement demand. The O.E Demand will increase with the production of original vehicles. The replacement demand is dependent on the wear and tear and replacement of the vehicle owners as this is a critical equipment and replacement is essential to run the vehicle, the replacement demand is bound to increase. With the setting up major automobile projects namely Ford Motors, Hyundai Motors, Hindustan Motors, Mitsuibishi and with expansion plans of Ashok Leyland & TAFE, Chennai emerges the Detroit of south East Asia. TamilNadu has always been a fore-runner in the industrial process, both in terms of industrial output and also terms of encouraging various new large-scale projects. Having recorded an impressive is growth industry in the post-reform span, it is poised for further industrial development and expansion. At present the state accounts for over 11-12% of India's industrial output. Automobile ancillaries have O.E. Market and Replacement market for all automobile

The Production and Sales trends for the past 7 years is given below:

Automobile Production Trends			(Number of Vehicles)				
Category	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**
Passenger Vehicles	723330	989560	1209876	1309300	1545223	1777583	1838697
Commercial Vehicles	203697	275040	353703	391083	519982	549006	417126
Three Wheelers	276719	356223	374445	434423	556126	500660	501030
Two Wheelers	5076221	5622741	6529829	7608697	8466666	8026681	8418626
Grand Total	6279967	7243564	8467853	9743503	11087997	10853930	11175479

Source: Society of Indian Automobile Manufacturers

Automobile Domestic Sales Trends			(Number of Vehicles)				
Category	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**
Passenger Vehicles	707198	902096	1061572	1143076	1379979	1549882	1551880
Commercial Vehicles	190682	260114	318430	351041	467765	490494	384122
Three Wheelers	231529	284078	307862	359920	403910	364781	349719
Two Wheelers	4812126	5364249	6209765	7052391	7872334	7249278	7437670
Grand Total	5941535	6810537	7897629	8906428	10123988	9654435	9723391

Domestic Sales

The cumulative growth of the Passenger Vehicles segment during April 2007 – March 2008 was 12.17 percent. Passenger Cars grew by 11.79 percent, Utility Vehicles by 10.57 percent and Multi Purpose Vehicles by 21.39 percent in this period.

The Commercial Vehicles segment grew marginally at 4.07 percent. While Medium & Heavy Commercial Vehicles declined by 1.66 percent, Light Commercial Vehicles recorded a growth of 12.29 percent.

Three Wheelers sales fell by 9.71 percent with sales of Goods Carriers declining drastically by 20.49 percent and Passenger Carriers declined by 2.13 percent during April- March 2008 compared to the last year.

Two Wheelers registered a negative growth rate of 7.92 percent during this period, with motorcycles and electric two wheelers segments declining by 11.90 percent and 44.93 percent respectively. However, Scooters and Mopeds segment grew by 11.64 percent and 16.63 percent respectively.

Despite the slow down in production of automobiles the demand for the automobiles is expected to grow in coming years.

D. TECHNICAL ASPECTS

1. Installed Capacity

The installed capacity of the proposed unit is manufacturing of 6000 Sets of Auto leaf springs (10 Leaves each) per annum. This is based on 20 sets of leaf springs per day of 8 hours working for 300 days in a year.

2. Plant and Machinery

The following machineries are required for production.

Machine name	Quantity (Nos)	Value (Rs.lakhs)
Power hacksaw Capacity-150 mm-1 HP	1	0.90
Centre Lathe 1200 x150 mm "	1	1.25
Bench Grinder 200 mm dia Pillar drilling machine 32 mm	1	0.25
Drilling machine pillar type 20 mm	1	1.45
Single action power Press 150 MT	1	6.85
Hand operated Eye Rolling machine	1	1.50
Pedestal Grinding machine450 x 50 mm	1	1.00
Hearth furnace and Blower	1	0.90
Oil fired Furnace	1	1.80
Oil fired furnace 1200x 750x 1800		1.60
Cambering machine		0.70
Quenching tank1800x 1200x900		1.00
Water tank and cooling tower		1.60
Spray painting Booth		0.20
Oil tank for furnace		0.60
Hand tools		0.25
Hardness tester		0.30
Spring load testing machine		1.80
Measuring Instruments		0.25
Jigs Fixtures and cutting Tools		0.80
Total		**25.00**

3. Manufacturing Process

The manufacturing of Automobile leaf springs involves the following sequence of operations.

Purchase of EN-45A flats and cutting to size

I

Drilling the holes and punching

I

Heating to 950° C for eye forming on main leaf

I

Eye forming on hand operated eye forming machine

I

Heating to 920-950 o C o in oil fired furnace for camber forming as well as hardening

I

Quenching into quenching oil tank for hardening

I

Tempering at 450°-550° C

I

Rectification for distortion for the spring

↓

Camber adjustment on power press Removing burs by files, emery paper/wheels finish fittings

↓

Eye grinding on pedestal grinder

↓

Fitting of bushes on main leaf

↓

Assembling of the leaf for making sets

↓

Load testing

↓

Painting and despatching

4. Raw Material

The raw materials required for manufacturing Automobile Leaf Springs are Spring steel flat varieties of EN-45 -A or EN-47 of suitable widths and thicknesses. The other materials are bushes, centre bolts, nuts, clamps, and pins, and other materials. These are available from dealers.

5. Land & Building

A rented place with 2000 sqft. area is required. The monthly rent is estimated at Rs.20000 and also an advance of Rs.200 000.

6. Utilities

Power:

The total power requirement of the unit will be 30 HP

Water:

Water is required only for human consumption.

Man power:

Category	Nos	Monthly salary	Total Salary
Manager	1	9000	9000
Supervisors	1	8000	8000
Skilled	4	6000	24000
Unskilled	8	4000	32000
Accountant	2	5000	10000
Security	2	4000	8000
	Total		91000
Add 10%benefits			9100
Total			10010

	0
Annually → Rs.12.01 lakhs	

7. Implementation Schedule

If financing arrangement is made available the project can be implemented within three months period.

8. ASSUMPTIONS

Installed capacity per annum	Auto Leaf Spring 6000 sets
Capacity utilization-Year -1	60%
Year-2	70%
Year-3	80%
Selling price per unit	Auto Leaf Springs Rs. 4500/set

Material cost at 100%	Qty(incldg. wastage)	Rate/MT	Value (Rs.lakhs)
EN-45A-Steel	420 MTs	Rs.48000	201.60

Consumables and Packing p.a. at 100% (Rs.lakhs)	Rs.2.40 lakhs
Power and Fuel-100%-Rs lakhs	Power Rs.2.82 lakhs (Furnace oil 36000 ltrs.Rs 11.52 Lakhs Hard Coke 36 ltrs rs 0.72 lakhs, Quenching oil 40 Litres Rs.3000)
Wages & salaries-100%	Rs.12.01 lakhs
Repairs & Maintenance per month	Rs.5000/-
Depreciation	WDV - 15%
General & administration Expenses per month	Rs.20000/-
Selling expenses	3% on Sales
Interest on term loan and Working capital	13% p.a

finance	
Income tax provision	34% on profit

LIST OF MACHINERY SUPPLIERS

Machine Tools

1. Quality Machine Tools
   New No.238, Linghi Chetty Strret
   Chennai 600 001
2. Gujrat Machine Tools
   New No.279, Linghi Chetty Street
   Chennai 600 001
3. Premier Machine Tools
   New No.103, Armenian Street
   Chennai 600 001
4. Machine Centre
   New No.214 linghi chetty Street
   Chennai 600 001

Tempering /Heat Treatment Furnaces

1. Pyrotherm Engineers
   245/2B Vanagaram Road
   Athipet
   Chennai-600 058
2. Pyromasters Furnaces Pvt Ltd
   A-13 SIDCO Industrial Estate
   Villivakkam
   Chennai-600 049
3. KSM Laboratory Glass Works
   40 NP.Thiru-vi-ka Industrial Estate
   Chennai-600 032
4. Thermal Systems
   TS-33 TVK Street
   Guindy
   Chennai_600 032

LIST OF RAW MATERIAL SUPPLIERS

1. Sai Steel Centre
   28-A, Mooker Nallamuthu Street
   Chennai-600 001
2. Mahavir Indusrial Corporation
   New No.273, Linghi Chetty Street
   Chennai-600 001

3. Bhagawandas Metals ltd
   No.54, Sembudoss street
   Chennai-600 001

4. Southern Iron and Steel company ltd
   No.7, Wallace garden Second Street
   Chennai-600 006

5. P.K.Vaduvammal
   97, Rasappa Chetty Street
   Chennai-600 003

6. Upper India steels ltd
   211.Vandana Towers
   Haddows Road
   Nugambakkam
   Chennai-600 034

AUTOMOBILE LEAF SPRING

1. COST OF PROJECT	[Rs.lakhs]
Land & Building (Advance)	2.00
Plant & Machinery	25.00
Other Misc. assets	1.00
Pre-Operative expenses	2.00
Margin for WC	3.87
	33.87

2. MEANS OF FINANCE	
Capital	15.12
Term Loan	18.75
	33.87

3. COST OF PRODUCTION & PROFITABILITY STATEMENTS

Years	1	2	3
Installed Capacity (Set)	6000	6000	6000
Utilisation	60%	70%	80%
Production/Sales (Set)	3600	4200	4800
Selling Price/set (in Rupee)	4,500	per set	
Sales Value	162.00	189.00	216.00
Raw Materials	120.96	141.12	161.28
Consumables	1.44	1.68	1.92
Power	9.05	10.56	12.07
Wages & Salaries	12.01	12.61	13.24
Repairs & Maintenance	0.60	0.63	0.66
Depreciation	3.75	3.19	2.71
Cost of Production	147.81	169.79	191.88
Admin, & General expenses	2.40	2.52	2.65
Selling expenses	4.86	5.67	6.48
Interest on Term Loan	2.44	2.13	1.52

Interest on Working Capital	1.84	1.84	1.84
Total	159.35	181.95	204.37
Profit Before Tax	2.65	7.05	11.63
Provision for tax	0.90	2.40	3.95
Profit After Tax	1.75	4.65	7.68
Add: Depreciation	3.75	3.19	2.71
Cash Accruals	5.50	7.84	10.39

4. WORKING CAPITAL:

	Months Consumption	Values	%	Margin Amount	Bank Finance
Raw Materials	0.75	7.56	25%	1.89	5.67
Consumables	1.00	0.12	25%	0.03	0.09
Finished goods	0.25	3.08	25%	0.77	2.31
Debtors	0.50	6.75	10%	0.68	6.07
Expenses	1.00	0.50	100%	0.50	0.00
		18.01		3.87	14.14

5. PROFITABILITY RATIOS BASED ON 80% UTILISATION

Profit after Tax / Sales	7.68 / 216.00	4%
Profit before Interest and Tax / Total Investment	14.99 / 48.01	31%
Profit after Tax / Promoters' Capital	7.68 / 15.12	51%

6. BREAK EVEN LEVEL

Fixed Cost (FC):

[Rs.lakhs]

Wages & Salaries	13.24
Repairs & Maintenance	0.66
Depreciation	2.71
Admin. & General expenses	2.65
Interest on TL	1.52
	20.78
Profit Before Tax (P)	11.63

$$BEL = \frac{FC \times 100}{FC + P}$$

$$\frac{20.78}{32.41} \times \frac{80}{100} \times 100$$

51% of installed capacity