AUTO LEAF SPRINGS
(FOR LCV HCV)

1. INTRODUCTION:

Auto leaf spring is one of the vital automobile components since full load of the chassis along with its contents rests on spring assembly. There are various sizes of springs depending on the type and nature of vehicles. Most of the heavy duty load carrier vehicles use Leaf springs.

2. PRODUCT & ITS APPLICATION:

A leaf spring is a simple form of spring commonly used for the suspension in wheeled vehicles. Originally called a laminated or carriage spring, and sometimes referred to as a semi-elliptical spring or cart spring.

Leaf springs are extensively used in all diesel and petrol driven vehicles. Use of leaf springs is increasing by the way of replacement of broken spring on the vehicle for transportation, in addition to new assembled four vehicles. It is used in most of four wheelers.

Due to large surface area, load is uniformly distributed to all over it, thus avoiding chances of breakage. Leaf spring takes less space and bear heavy load.

There are many type of Leaf Spring as follows:

- Double-eye leaf springs
- Open-eye leaf springs

The leaf spring acts as a linkage for holding the axle in position and thus separate linkage are not necessary. It makes the construction of the chassis suspension simple and strong.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Preferably mechanical/metallurgy engineering background.

4. INDUSTRY OUTLOOK/TREND

Auto leaf springs are essential component for passenger vehicles and goods carriers and other 4 wheeler automobiles viz earth moving machine engines as well as trailers. They are also used in railways and tractor trollies. Being part of the component industry we can view the Indian auto-components industry that has experienced healthy growth over the last two decades. The auto-component industry of India has expanded by 14.3 per cent because of strong growth in the spares or after-market sales to reach at a level of Rs 2.92 lakh crore (US$ 44.90 billion) in the year 2017. The auto-components industry accounts for almost seven per cent of India's Gross Domestic Product (GDP) and employs as many as 25 million people, both directly and indirectly. A stable government framework, increased purchasing power, large domestic market, and an ever increasing development in infrastructure have made India a favourable destination for investment.

The Indian auto industry is one of the largest in the world. India has emerged as a prominent auto exporter and has strong export growth expectations for the near future. The overall Passenger Vehicle (PV) segment has 14 per cent market share. Production of passenger vehicles, commercial vehicles, three wheelers and two wheelers grew at 5.41 per cent in FY17 to 25,316,044 vehicles from 24,016,599 vehicles in FY16. The sales of passenger vehicles, commercial vehicles and two wheelers grew by 9.23 per cent, 4.16 per cent and 6.89 per cent respectively, during the period April-March 2017. The growing interest of the companies in exploring the rural markets further aided the growth of the sector. The Indian automotive spare component market or aftermarket is estimated to grow at around 10-15 per cent to reach US$ 16.5 billion by 2021 from around US$ 7 billion in 2016. It has the potential to generate up to US$ 300 billion in annual revenue by 2026, create 65 million additional jobs and contribute over 12 per cent to India's Gross

Domestic Product

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Domestic sales of commercial vehicles are expected to grow at a CAGR of 11.6% from 0.6 million in 2015 to more than 2 million by 2026. With the increasing automobile demand, the country is also proportionately expected to witness a surge in auto components used for these vehicles.

Auto Leaf springs are essential component of passenger and goods vehicles, and India emerging as major auto manufacturer in the world with first and second largest position in terms of production volumes augers well for the products in domestic as also for exports. The Indian automobiles and its ancillary component industry are now emerging as leading exporter in the world. Therefore Auto leaf springs will have good potential.

6. RAW MATERIAL REQUIREMENTS:

Main material required is spring steel alloy flats suitable for forging and fasteners to assemble the unit.

7. MANUFACTURING PROCESS:

The alloy steel flats are cut to length and drilled. These flats are heated and rolled into formation of eye at both the ends. Steel flats are heated, are forged to give the required camber (in hot condition) for specific shape depending on the position of the flat in the spring and quenched in oil.

After hardening, these are again heated for tempering. Shot blasting operation carried out on the hardened &tempered spring flats.

Subsequently various tests like Hardness testing, Camber tests are carried out. Leaf springs should be manufactured adhering to IS: 1135/73 specification. Quality of raw Materials should conform to the composition as prescribed in IS: 3431/65.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 11 employees initially and increase to 27 or more depending on business volume.

Sr No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	15000	3	4	5	6	6
2	Semi-Skilled/ Helpers	8000	6	9	15	18	18
4	Supervisor/ Manager	25000	1	1	1	1	1
5	Accounts/ Marketing	15000	1	1	1	1	1
6	Other Staff	7000	0	0	1	1	1
	TOTAL		11	15	23	27	27

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

The unit is based on selection of location, renting premises for the unit.

Sr. No	Activities	Time Required in Months
1	Acquisition of Premises	1
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	1
	Total Time Required (Some Activities run concurrently)	6

10. COST OF PROJECT:

The unit will require total project cost of Rs 68.66 lakhs as shown below:

Sr. No	Particulars	In Lakhs
1	Land	10.00
2	Building	15.00
3	Plant and Machinery	19.80
4	Fixtures and Electrical Installation	2.55
5	Other Assets/ Preliminary and Preoperative Expenses	2.00
6	Margin for working Capital	19.31
	TOTAL PROJECT COST	68.66

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 31.65 lakhs and seek bank loans of Rs 37.01 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	31.65
2	Loan Finance	37.01
	TOTAL :	68.66

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	13.23	40	5.29	7.94
2	Receivables	14.66	50	7.33	7.33
3	Overheads	1.40	100	1.40	0.00
4	Creditors	13.23	40	5.29	7.94
	TOTAL	42.52		19.31	23.21

13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantit	Rate	Total

			y		Value
	Main Machines/ Equipment				
1	Band Saw Machines	Nos	1	65000	65000
2	Shearing Machine	Nos	1	40000	40000
3	Oil fired Hearth Furnace for blanks		1	450000	450000
4	Forging/ Camber rolling machine		1	200000	200000
5	Eye Rolling machine	Nos	1	120000	120000
6	Grinding machine for eye		1	100000	100000
7	Tempering furnace		1	120000	120000
8	Shot Blasting Machine		1	450000	450000
9	Spring Test Equipment		1	320000	320000
	Subtotal :				1865000
	Tools and Ancillaries				
1	Weighing m/c	LS	1	35000	35000
2	Misc. tools fixtures etc.	LS	1	80000	80000
	Subtotal :				115000
	Fixtures and Elect Installation				
	Storage racks and trolleys	LS	1	15000	15000
	Other Furniture	LS	1	20000	20000
	Telephones/ Computer	LS	1	40000	40000
	Electrical Installation	LS	1	180000	180000
	Subtotal :				255000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	200000	200000
	TOTAL PLANT MACHINERY COST				2435000

All the machines and equipments are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to

look at reconditioned imported machines, dies and toolings. Some of the machinery and dies and toolings suppliers are listed here below:

1. Machine Junction
   Plot No. 1, Basai Garhi Road
   Basai Garhi Road, Gurgaon-122001, Haryana,

2. Machine Tools India Limited
   D- 24, South Extension- 2,
   New Delhi-110049, Delhi, India

3. Unique Engineering Works
   No. 1778 Street No. 38, Janta Nagar, Ludhiana,
   Ludhiana-141003, Punjab, India
4. Prakash Fabricators
   1034, E, Rajaram Road,
   Kolhapur-416008, Maharashtra, India

5. ABM Industries
   Kadari Chawl, Shop No. 5, Chimatpada Near Punjab Dairy,
   Tejpal Scheme, Vile Parle East, Mumbai-400072, Maharashtra

6. Power Man Machines
   Police Station Road, Muvattupuzha,
   Ernakulam-686661, Kerala, India

14. PROFITABILITY CALCULATIONS:

Sr. No	**Particulars**	**UOM**	**Year Wise estimates**				
			Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1	Capacity Utilization	%	40	50	60	70	80
2	Sales	Rs Lakhs	175.92	219.90	263.88	307.86	351.84

3	Raw Materials & Other Direct Inputs	Rs Lakhs	158.78	198.48	238.17	277.87	317.56
4	Gross Margin	Rs Lakhs	17.14	21.42	25.71	29.99	34.28
5	Overheads Except Interest	Rs Lakhs	11.57	11.57	11.57	11.57	11.57
6	Interest	Rs Lakhs	5.18	5.18	5.18	5.18	5.18
7	Depreciation	Rs Lakhs	3.94	3.94	3.94	3.94	3.94
8	Net Profit Before Tax	Rs Lakhs	-3.55	0.74	5.02	9.31	13.59

The basis of profitability calculation:
The Unit will have capacity of 500 Mt of springs per year of assorted types/ designs of springs and fasteners like U Bolts etc. for spring. The capacity build up is taken considering the sales related from OEM/ Retail network that is built up by the entrepreneur based on his prior experience in the industry.

The sales prices of leaf springs of various types range from Rs 75 to Rs 90 per Kg. The spring steel flats/ strips costs range from range from Rs 55 to Rs 70 per Kg. The material requirements are considered with wastage/ scrap of 5% of finished products which are sold as scrap at @ Rs20 ~30 per Kg. and the income of same is added. The Administrative and Overheads are taken at Rs. 10000 per month.

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10-12% and Interest costs are taken at 14 -15% depending on type of industry.

15. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 48.27 % of the installed capacity as depicted here below:

Sr. No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	439.80
2	Variable Costs	Rs Lakhs	396.95
3	Fixed Cost incl. Interest	Rs Lakhs	20.68
4	Break Even Capacity	% of Inst Capacity	48.27

16. STATUTORY/ GOVERNMENT APPROVALS

There are no special permissions or licenses required for the unit except the regular state industrial unit registration, IEC Code for Export and local authority clearances. The industry registration and approval for factory plan, safety for Fire requirement, registration as per Labour laws ESI, PF etc. shall be required as per rules and applicability. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipments offer little scope for diversification into producing other consumer and industrial parts/ components. However the unit can add few machines to produce normal sand castings, etc. by using the spare capacities of furnace and machining capabilities. As such there is not much scope for organic backward or forward integration.

18. TRAINING CENTERS/COURSES

There are no specific training centers for production technology. However foundry technology can be obtained by joining as apprentice in foundry units. The prototype development center at Rajkot can provide some assistance and for dies and Tools development, courses run by centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, etc. shall be helpful.

The most important scope of learning is in new product design and development by study of the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data from websites of Viz. North American, Europe, China etc. markets.

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

Source:- Udyami Mitra/Sidbi