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PROJECT REPORT

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PROJECT: AUTOMOBILE GEAR MANUFACTURING UNIT

PROJECT REPORT

OF

AUTOMOBILE GEAR MANUFACTURING UNIT

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding Automobile gear manufacturing Unit.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]

PROJECT AT GLANCE

1	**Name of Proprietor/Director**	XXXXXXXX
2	**Firm Name**	XXXXXXXX
3	**Registered Address**	XXXXXXXX
4	**Nature of Activity**	XXXXXXXX
5	**Category of Applicant**	XXXXXXXX
6	**Location of Unit**	XXXXXXXX
7	**Cost of Project**	24.72 Rs. In Lakhs
8	**Means of Finance**	
i)	**Own Contribution**	2.47 Rs. In Lakhs
ii)	**Term Loan**	15.75 Rs. In Lakhs
iii)	**Working Capital**	6.50 Rs. In Lakhs
9	**Debt Service Coverage Ratio**	3.07
10	**Break Even Point**	0.27
11	**Power Requiremnet**	20 KW
12	**Employment**	9 Persons
13	**Major Raw Materials**	Alloy Steels, nonferrous alloys, cast irons, powder-metallurgy and even plastics.

14 Details of Cost of Project & Means of Finance

Cost of Project

Particulars	Amount in Lacs
Land	Owned/Leased
Building & Civil Work	Owned/Leased
Plant & Machinery	16.00
Furniture & Fixture	0.50
Other Misc Assets	1.00
Working Capital Requirement	7.22
Total	**24.72**

Means of Finance

Particulars	Amount in Lacs
Own Contribution	2.47
Term Loan	15.75
Working capital Loan	6.50
Total	**24.72**

1. INTRODUCTION

A gear is a rotating machine part having cut teeth, which mesh with another toothed part to transmit torque. Geared devices can change the speed, torque, and direction of the power source. Gears almost always produce a change in torque, giving a mechanical advantage through their gear ratio and can also be considered a simple machine.

Gears of various type, size and material are widely used in several machines from simple wall clocks and wrist watches to simple machines to complex machines and manufacturing machine tools, to automobiles, aviation, defense, to very large gear boxes are used in large ships, cranes, wind turbines, Railways, aviation, space telescopes to construction machinery, for dam gate operations and heavy weight lifting machines and systems requiring positive and stepped drive.

There are several types of gears, among them the simplest type of gear is the Spur gear. They consist of a cylinder or disk with teeth projecting radially. Although the teeth are not straight sided, the edge of each tooth is straight and aligned parallel to the axis of rotation. These gears mesh together correctly only if fitted to parallel shafts. No axial thrust is created by the tooth loads. Spur gears are excellent at moderate speeds but tend to be noisy at high speeds.

2. PRODUCT DESCRIPTION

2.1 PRODUCT USES

Gears are very much important in our day-to-day life. Clocks, bicycles, automobiles and heavy-duty industrial machines all rely on common gears and without these, we wouldn't be able to live the modern, convenient lives we live today.

2.2 RAW MATERIAL REQUIREMENT

Various grades of **alloy steels** are most commonly used because of their high strength-to-weight ratio and low cost. These are either cast or forged depending on end application. Gear production is done by machining of standard stock items like rods, billets.

Numerous nonferrous alloys, cast irons, powder-metallurgy and even plastics are used in the manufacture of gears. The gear blanks are produced by die cast, investment casting, and powder metallurgy etc. processes.
The project may select product mix and select gear blank process viz casting / forging to focus the end consumer segments

2.3 MANUFACTURING PROCESS

Manufacture of gears needs several processing operations in depending upon the material and type of the gears and quality desired.

The stages generally are:

- Preforming the blank without or with teeth
- Annealing of the blank, if required, as in case of forged or cast steels
- Preparation of the gear blank to the required dimensions by machining
- producing teeth or finishing the preformed teeth by machining
- Full or surface hardening of the machined gear (teeth), if required
- Finishing teeth, if required, by shaving, grinding etc.
- Inspection of the finished gears.

Gear blanks and even gears along with teeth requiring substantial to little machining or finishing are produced by various casting processes.

- **Sand mold casting**: for large cast iron gears, low speed machinery and hand operated devices.
- **Shell mold casting**: Small gears in batches are often produced by this process.
- **Centrifugal casting:** The solid blanks or the outer rims (without teeth) of worm wheels made of cast iron, phosphor bronze or even steel are preferably performed by centrifugal casting. The performs are machined to form the gear blank of proper size. Then the teeth are developed by machining.
- **Metal mold casting:** Medium size steel gears with limited accuracy and finish are often made in single or few pieces by metal mold casting. For general and precision use the cast preforms are properly machined.
- **Die casting**: Large lot or mass production of small gears of low melting point alloys of Al, Zn, Cu, Mg etc. are done mainly by die casting. Such reasonably accurate gears are directly or after little further finishing are used under light load and moderate speeds, for example in instruments, camera, toys.
- **Investment casting:** This near-net-shape method is used for producing small to medium size gears of exotic materials with high accuracy and surface finish hardly requiring further finishing. These relatively costly gears are generally used under heavy loads and stresses.

It is estimated that almost 80% of all gearing produced worldwide is produced by using gear blanks cast, forged, in near final shape.

Machining:

The most common form of gear machining is cutting metal by tools called hob. The hobbing cutters rotate and mesh with gear blank like a meshing gear thereby generating teeth profile on blank. Other processes like gear shaping, milling, and broaching also exist. For metal gears in the transmissions of cars and trucks, the teeth are heat treated to make them hard and more wear resistant while leaving the core soft and tough. For large gears that are prone to warp, a quench press is used.

Finishing Processes:

Gear-tooth shaving, grinding, honing and lapping is the finishing processes that provide tooth profile correction, accurate tolerances and surface finish. Gear-honing machines produce teeth to reduce the surface roughness of the tooth profile. Gears are lapped on gear-lapping machines after they have undergone heat treatment.

3. PROJECT COMPONENTS

3.1 Land /Civil Work

The land require for this manufacturing unit will be approx. around 3000-2500 square feet.

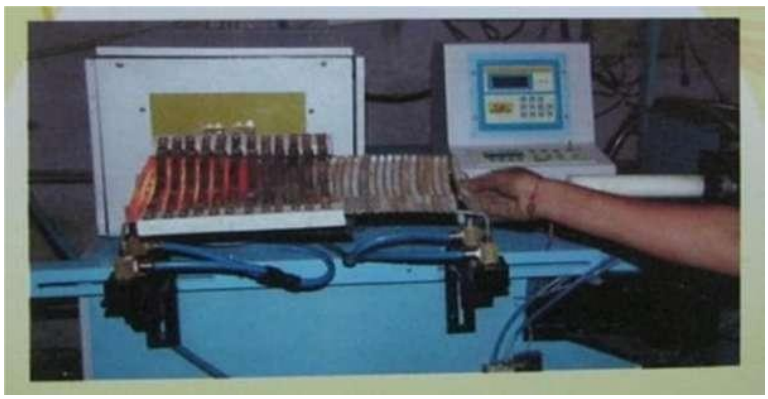
We have not considered the cost of Land purchase & Building Civil work in the project. It is assumed that land & building will be on rent & approx. rental of the same will be Rs. 30,000-40,000 per month.

3.2 Plant & Machinery

This plant will be semiautomatic type.

- **Blank/ Billet cutting machines**

- **Induction Heater for blank**



- **Pneumatic Forging Hammer**

- **Mech Forging Hammer**

- **Gear Hobbing Machine**

- **Gear Grinding Machine**

- **Heavy Duty Milling Machine**

- **Heat Treatment Induction Type**

- **Shot blasting machine**

- **CNC Lathe**

- **Cylindrical Grinder**

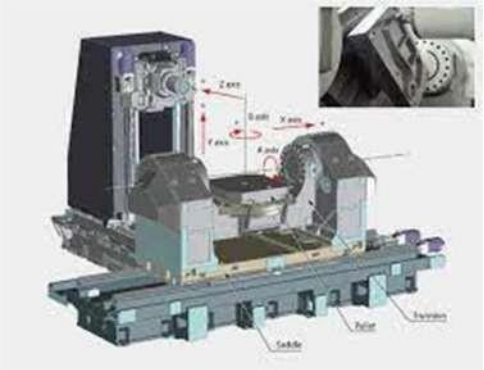
- **Lapping Machine**

- **Lathe machine**

- **Vertical Lathe**

- **Radial & Pillar Drilling Machine**

- **5 axis Measuring m/c CNC**



Testing Equipment's

- **Gear Profile Inspection and Other Testing Machine**

- **Tools:** While assembling the product these tools will be required- Screwdriver, Twizzers, Wirecutter, Wire strippers, etc.

4 LICENSE & APPROVALS

- GST
- NOC from Fire Department.
- NOC From Pollution Department (if applicable)
- Udyam Registration is required.
- BIS certification
- Labour license.
- Trademark (optional)

PROJECTED BALANCE SHEET **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Liabilities					
Capital					
Opening Balance		3.64	5.90	9.61	13.49
Add:- Own Capital	2.47				
Add:- Retained Profit	3.67	6.77	9.70	12.39	15.11
Less:- Drawings	2.50	4.50	6.00	8.50	10.50
Closing Balance	**3.64**	**5.90**	**9.61**	**13.49**	**18.10**
Term Loan	14.00	10.50	7.00	3.50	0.00
Working Capital Limit	6.50	6.50	6.50	6.50	6.50
Sundry Creditors	2.01	2.84	3.29	4.08	4.63
Provisions & Other Liabilities	2.00	2.50	3.13	3.75	4.69
TOTAL :	**28.15**	**28.25**	**29.52**	**31.32**	**33.92**
Assets					
Fixed Assets (Gross)	17.50	17.50	17.50	17.50	17.50
Gross Depriciation	2.60	4.81	6.70	8.30	9.66
Net Fixed Assets	**14.90**	**12.69**	**10.80**	**9.20**	**7.84**
Current Assets					
Sundry Debtors	4.59	5.65	6.55	7.50	8.50
Stock in Hand	5.08	5.94	6.81	7.74	8.73
Cash and Bank	2.08	1.97	1.35	3.38	4.85
Loans & Advances/Other Current Assets	1.50	2.00	4.00	3.50	4.00
TOTAL :	**28.15**	**28.25**	**29.52**	**31.32**	**33.92**

PROJECTED PROFITABILITY STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Capacity Utilisation %	**35%**	**40%**	**45%**	**50%**	**55%**
SALES					
Gross Sale					
AUTOMOBILE GEARS	91.77	113.00	131.03	150.05	170.07
Total	**91.77**	**113.00**	**131.03**	**150.05**	**170.07**
COST OF SALES					
Raw Material Consumed	60.38	71.07	82.35	94.25	106.78
Electricity Expenses	1.34	1.84	2.07	2.30	2.53
Depreciation	2.60	2.21	1.88	1.60	1.36
Wages & labour	8.88	9.77	10.74	11.82	13.00
Repair & maintenance	1.84	2.26	2.62	3.00	3.40
Consumables	3.67	4.52	5.24	6.00	6.80
Packaging cost	2.75	3.39	3.93	4.50	5.10
Cost of Production	81.46	95.06	108.85	123.48	138.99
Add: Opening Stock	-	4.07	4.75	5.44	6.17
Less: Closing Stock	4.07	4.75	5.44	6.17	6.95
Cost of Sales	77.39	94.38	108.16	122.75	138.21
GROSS PROFIT	**14.38**	**18.62**	**22.87**	**27.30**	**31.86**
	15.67%	**16.48%**	**17.46%**	**18.19%**	**18.73%**
Salary to Staff	3.48	3.65	3.84	4.03	4.23
Interest on Term Loan	1.55	1.36	0.98	0.59	0.21
Interest on working Capital	0.72	0.72	0.72	0.72	0.72
Rent	3.60	3.96	4.36	4.79	5.27
Selling & Administration Expenses	1.38	1.70	1.97	2.25	2.55
TOTAL	**10.72**	**11.39**	**11.85**	**12.38**	**12.98**
NET PROFIT	3.67	7.23	11.02	14.92	18.89
Taxation	-	0.46	1.32	2.54	3.77
PROFIT (After Tax)	3.67	6.77	9.70	12.39	15.11
NET PROFIT RATIO	**3.99%**	**5.99%**	**7.40%**	**8.25%**	**8.89%**

PROJECTED CASH FLOW STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
SOURCES OF FUND					
Own Margin	2.47				
Net Profit	3.67	7.23	11.02	14.92	18.89
Depriciation & Exp. W/off	2.60	2.21	1.88	1.60	1.36
Increase in Cash Credit	6.50	-	-	-	-
Increase In Term Loan	15.75	-	-	-	-
Increase in Creditors	2.01	0.83	0.45	0.79	0.54
Increase in Provisions & Other liabilities	2.00	0.50	0.63	0.63	0.94
TOTAL :	**35.00**	**10.77**	**13.98**	**17.94**	**21.73**
APPLICATION OF FUND					
Increase in Fixed Assets	17.50				
Increase in Stock	5.08	0.86	0.88	0.93	0.98
Increase in Debtors	4.59	1.06	0.90	0.95	1.00
Repayment of Term Loan	1.75	3.50	3.50	3.50	3.50
Loans & Advances/Other Current Assets	1.50	0.50	2.00	- 0.50	0.50
Drawings	2.50	4.50	6.00	8.50	10.50
Taxation	-	0.46	1.32	2.54	3.77
TOTAL :	**32.92**	**10.88**	**14.60**	**15.92**	**20.26**
Opening Cash & Bank Balance	-	2.08	1.97	1.35	3.38
Add : Surplus	2.08	-0.11	-0.62	2.02	1.47
Closing Cash & Bank Balance	**2.08**	**1.97**	**1.35**	**3.38**	**4.85**

CALCULATION OF D.S.C.R

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
CASH ACCRUALS	6.27	8.98	11.58	13.99	16.48
Interest on Term Loan	1.55	1.36	0.98	0.59	0.21
Total	7.81	10.34	12.56	14.58	16.69
REPAYMENT					
Instalment of Term Loan	1.75	3.50	3.50	3.50	3.50
Interest on Term Loan	1.55	1.36	0.98	0.59	0.21
Total	3.30	4.86	4.48	4.09	3.71
DEBT SERVICE COVERAGE RATIO	**2.37**	**2.13**	**2.81**	**3.56**	**4.50**
AVERAGE D.S.C.R.					**3.07**

REPAYMENT SCHEDULE OF TERM LOAN							
					Interest		11.00%
Year	**Particulars**	**Amount**	**Addition**	**Total**	**Interest**	**Repayment**	**Closing Balance**
ist	Opening Balance	-					
	1st month		15.75	15.75	-	-	15.75
	2nd month	15.75	-	15.75	0.14	-	15.75
	3rd month	15.75	-	15.75	0.14	-	15.75
	4th month	15.75		15.75	0.14	-	15.75
	5th month	15.75	-	15.75	0.14	-	15.75
	6th month	15.75	-	15.75	0.14	-	15.75
	7th month	15.75	-	15.75	0.14	0.29	15.46
	8th month	15.46	-	15.46	0.14	0.29	15.17
	9th month	15.17	-	15.17	0.14	0.29	14.88
	10th month	14.88	-	14.88	0.14	0.29	14.58
	11th month	14.58	-	14.58	0.13	0.29	14.29
	12th month	14.29	-	14.29	0.13	0.29	14.00
					1.55	1.75	
2nd	Opening Balance						
	1st month	14.00	-	14.00	0.13	0.29	13.71
	2nd month	13.71	-	13.71	0.13	0.29	13.42
	3rd month	13.42	-	13.42	0.12	0.29	13.13
	4th month	13.13	-	13.13	0.12	0.29	12.83
	5th month	12.83	-	12.83	0.12	0.29	12.54
	6th month	12.54	-	12.54	0.11	0.29	12.25
	7th month	12.25	-	12.25	0.11	0.29	11.96
	8th month	11.96	-	11.96	0.11	0.29	11.67
	9th month	11.67	-	11.67	0.11	0.29	11.38
	10th month	11.38	-	11.38	0.10	0.29	11.08
	11th month	11.08	-	11.08	0.10	0.29	10.79
	12th month	10.79	-	10.79	0.10	0.29	10.50
					1.36	**3.50**	
3rd	Opening Balance						
	1st month	10.50	-	10.50	0.10	0.29	10.21
	2nd month	10.21	-	10.21	0.09	0.29	9.92
	3rd month	9.92	-	9.92	0.09	0.29	9.63
	4th month	9.63	-	9.63	0.09	0.29	9.33
	5th month	9.33	-	9.33	0.09	0.29	9.04
	6th month	9.04	-	9.04	0.08	0.29	8.75
	7th month	8.75	-	8.75	0.08	0.29	8.46
	8th month	8.46	-	8.46	0.08	0.29	8.17
	9th month	8.17	-	8.17	0.07	0.29	7.88
	10th month	7.88	-	7.88	0.07	0.29	7.58
	11th month	7.58	-	7.58	0.07	0.29	7.29
	12th month	7.29	-	7.29	0.07	0.29	7.00
					0.98	**3.50**	

4th	1st month	7.00	-	7.00	0.06	0.29	6.71
	2nd month	6.71	-	6.71	0.06	0.29	6.42
	3rd month	6.42	-	6.42	0.06	0.29	6.13
	4th month	6.13	-	6.13	0.06	0.29	5.83
	5th month	5.83	-	5.83	0.05	0.29	5.54
	6th month	5.54	-	5.54	0.05	0.29	5.25
	7th month	5.25	-	5.25	0.05	0.29	4.96
	8th month	4.96	-	4.96	0.05	0.29	4.67
	9th month	4.67	-	4.67	0.04	0.29	4.38
	10th month	4.38	-	4.38	0.04	0.29	4.08
	11th month	4.08	-	4.08	0.04	0.29	3.79
	12th month	3.79	-	3.79	0.03	0.29	3.50
					0.59	**3.50**	
5th	Opening Balance						
	1st month	3.50	-	3.50	0.03	0.29	3.21
	2nd month	3.21	-	3.21	0.03	0.29	2.92
	3rd month	2.92	-	2.92	0.03	0.29	2.63
	4th month	2.63	-	2.63	0.02	0.29	2.33
	5th month	2.33	-	2.33	0.02	0.29	2.04
	6th month	2.04	-	2.04	0.02	0.29	1.75
	7th month	1.75	-	1.75	0.02	0.29	1.46
	8th month	1.46	-	1.46	0.01	0.29	1.17
	9th month	1.17	-	1.17	0.01	0.29	0.88
	10th month	0.88	-	0.88	0.01	0.29	0.58
	11th month	0.58	-	0.58	0.01	0.29	0.29
	12th month	0.29	-	0.29	0.00	0.29	0.00
					0.21	**3.50**	

DOOR TO DOOR	60	MONTHS
MORATORIUM PERIOD	6	MONTHS
REPAYMENT PERIOD	54	MONTHS

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