Project Profile

PRODUCT	:	AUTOMOBILE CRANK SHAFT
PRODUCT CODE	:	75047
QUALITY STANDARDS	:	The following Indian Standards may be referred to for better quality of the product. IS : 1762-1961 IS : 4863-1968 IS : 3930-1966 IS : 5517-1969
PRODUCTION CAPACITY	:	45000 Nos. or Automobile Crank Shafts for [3 Cylinder & 4 cylinder engines] specially car per annum valued at Rs. 35250000.00
MONTH & YEAR OF PREPARATION	:	Sep, 2011
PREPARED BY	:	**MECHANICAL DIVISION** **M.S.M.E. – Development Institute** **10 – Industrial Estate, Pologround,** **Indore – 452 015** **Phone : 0731-2421048/2421540** **Fax : 91-0731-2420723** **Email : dcdi-indore@dcmsme.gov.in**

INTRODUCTION

Crank Shaft is a very important part of an automobile engine. As the name implies it gives Cranking action to the whole engine including the flywheel. As being a very vital part of an automobile engine, its action i. e. movement operates the inlet and outlet valves as per the configuration or an engine through camshaft. Crankshaft is a forged items mainly from C-45 Carbon Steel and has journals and Crank pin as per the requirements of an engine. In an automobile engine whether it is 3 cylinders or 4-cylinder only single crankshaft is used. The journals and other pins are of extremely super fine lapped finish.

MARKET

The Crank Shaft finds its uses in automobile engine [Diesel / Petrol] compressors etc. with opening of Indian economy multinational companies have already entered into the Indian market. Few of the well-known and reputed companies, which have recently entered into the market are M/s Daewoo, Hinduai, Opel Ashtra, Ford, Escorts, Tata's, Mitshubishi, Honda etc. since these companies have come in a big way and there is a good demand for automobile particularly in medium and small engine capacity. Also there is a good scope as spare parts /replacement parts market. Looking to these parameters it is expected that the demand for Crank Shaft will go up in the coming future. As per the availability information there is also a very good opportunity for exports with ISO –9000/QS –9000 companies as well as some of very good quality crankshaft manufacturing companies.

BASIS OF PRESUMPTION

1. This project profile has been prepared on single shift working of 8 hours per day at 75 % efficiency and 300 working days in a year.
2. Arrangement for labour wages has been made as per the prevailing market rates, which may vary from place to place, and the minimum wages fixed by the concerned authorities from time to time.
3. A period of three years after commencing the commercial production has been considered for achieving full / envisaged capacity.
4. Interest on fixed capital and working capital has been calculated at an average rate of 18 % per annum.
5. A provision of 30 % of project cost / investment has to be made by the entrepreneur for margin money.
6. Rates quoted in respect of machines equipment and raw materials are those prevailing at the time of preparation of this project profile and are likely to vary from supplier to supplier and place to place.
7. Forged crankshaft is to be purchased from out side. A provision for this has already been made in this regard.

IMPLEMENTATION SCHEDULE

The following activities are required to be completed during the implementation schedule / period :

S. No.	Nature of activities	Time period in month [estimated]
1.	Selection of product	4 weeks
2.	Selection of industrial site	2 weeks
3.	Provisional registration	2 weeks
4.	Preparation of project report	2 weeks
5.	Application for finance and getting loan sanctioned.	24 weeks
6.	Recruitment of man power	4 weeks
7.	Purchase and installation of machinery	14 weeks
8.	Total run	1 week

It is necessary to obtain permanent registration certificate from the concerned District Industries Centre.

TECHNICAL ASPECT

The manufacturing process of crankshaft is to be followed as per the sequence of operations to minimize the material flow. First of all, facing and centering is to be done on both faces on win spindle twin station facing and centering machine. Then rough turning of journals and pins, webs is to be done on spm. Then finish turning is to be done on special turning machine. Then boltholes, flat, oil hole drilling [deep hole drilling] is to be done on SPM. Transfer line type, chamfering on deep hole drills is to be done on N C chambering machine, journals grinding is to done on crankshaft grinding machine. Crankpins to be grounded on SPM. Dynamic balancing is to be done on special purpose dynamic balancing machine. Then lapping of pins and journals is to be done on special purpose lapping machine. Finally, testing and inspection is to be done. At last antirust oil is to be applied on whole Crankshaft.

Quality Control & Standard

- It is suggested to carryout the stage inspection during manufacturing processes :
- Diameter of journals is to be checked.
- Diameter of crankpins is to be checked.
- Tapping hole and pitch of thread is to be checked.
- Thickness of flat is to be checked.
- Roughness of lapping faces is to be checked.
- Bend / Warpage test is to be done.

Production Capacity Per Annum

It is proposed to produce 45000 nos. of automobile crankshaft worth of Rs. 35250000.00 per annum.

- Approximately 60 KW motive power will be required.

Pollution Control

The manufacturing of automobile Crankshaft does not pose any problem or pollution, however, proper attention should be paid for ventilation etc. A provision for installing pollution control equipment has been made in this project profile.

Energy Conservation

Suitable energy efficient motors are to be used on proposed machines with provision of recommended shunt capacitors.

FINANCIAL ANALYSIS

(i) Fixed Capital :

Land and Building Built up area approximately 450 sq. mtrs. @ ft. mtr.	Rented	9000.00

(ii) Machinery & Equipment

Sl. No.	Description	Ind./ Imp.	Qty.	Price
01	Special purpose twin spindle twin head, twin working station facing and centering machine suitable for 3 & 4 cylinder crankshaft with 10 HP Electric motors and starter etc.	Ind.	1	5000000.00
02	Special purpose CNC crankshaft turning machine suitable for 3 & 4 cylinder crankshaft complete with auto door opening and closing at the start and finish of working cycle with tool magazine and 7.5 HP electric motor and starter etc.	Ind.	2	5500000.00
03	Special purpose multi-station machine suitable for 3 & 4 cylinder engine crankshaft for bolt hole, drilling and tapping dowel/pin hole drilling, flat milling etc. with 10 HP electric motor and starter.	Ind.	1	525000.00
04	Special purpose multi-orientation deep hole drilling machine [Gun drilling machine] suitable for 3 & 4 cylinder engine crankshaft for drilling of oil hole at required configuration with 10 HP electric motor and starters etc.	Ind.	1	400000.00
05	N C Chambering Machine suitable for chambering of oil hole on 3 & 4 cylinder engine with 2 HP electric motor and starter.	Ind.	1	550000.00
06	Special purpose journal grinding machine suitable for 3 & 4 cylinder crankshaft complete with 5 HP electric motor and starter.	Ind.	1	120000.00
07	Special purpose crankpin grinding machine suitable for 3 & 4 cylinder engine crankshaft complete with 5 HP electric motor and starter.	Ind.	1	600000.00

08	Special purpose dynamic balancing m/c. suitable for 3 & 4 cylinder engine crankshaft with rotating and shifting device drilling device etc. with 3 HP and 2 HP electric motor and starter.	Ind.	1	200000.00
09	Special purpose belt polishing machine, suitable for 3 & 4 cylinder engine crank shaft complete with lapping belt & electric motor of 3 HP & starter etc.	Ind.	1	150000.00
10	Double ended bench grinding machine with 10" X 1" X ¾" wheel size and CI pedestal with 1 HP Electrical Motor & Starter etc.	Ind.	1	15000.00
11	Flexible shaft grinder wheel size 6" complete with 1 HP, 3-phase electric motor and starter & 6-½ feet shaft length.	Ind.	1	10000.00
12	Air compressor with 7.5 HP electric motor with automatic pressure switch, belt guard etc.	Ind.	1	50000.00
13	Universal tool & cutter grinding machine with 1 HP electric motor & starter.	Ind.	1	300000.00
14	Drill point grinding machine with 1 HP electric motor & starter and fixture etc.	Ind.	1	85000.00
	Testing & Inspection Equipments :			
15	Measuring instruments such as Vernier Caliper of various sizes, roughness tester, hardness tester [both pocket type] micrometers, hand tools etc.	Ind.	LS	150000.00
16	Energy conservation equipments	Ind.	LS	20000.00
17	Pollution Control Equipments	Ind.	LS	13695000.00
18	Electrification & installation charges @ 10 % of cost of machines and equipments	Ind.	LS	1369500.00
19	Cost of jigs & fixtures [for machining and inspection, gauges, wheel balancing equipments etc.]	Ind.	LS	200000.00
20	Cost of office equipments	Ind.	LS	50000.00
	Pre operative expenses		**LS**	**25000.00**
	Total fixed cost			**15339500.00**

WORKING CAPITAL [per month]

1. Personnel :

Administrative / Supervisory

Sl. No.	Description / Designation	No.	Salary	Total
01	Manager	1	4500.00	15000.00
02	Supervisor	1	3000.00	8000.00
03	Foreman	1	3000.00	8000.00
04	Accountant	1	2500.00	5000.00
05	Clerk cum typist	1	1800.00	3000.00
06	Store keeper	1	1800.00	3000.00
2.	**Technical**			
07	Skilled worker	6	3500.00	21000.00
08	Inspector Q C	2	4000.00	8000.00
09	Semiskilled worker	5	2500.00	15000.00
10	Unskilled worker	5	2000.00	10000.00

11	Chowkidar / Watchman	1	2000.00	2000.00
	Add perquisites @ 15 % of salary and wages			**98000.00**
	Total			**112700.00**

3. Raw Material [Including packaging requirement] per month :

Sl. No.	Particular	Ind./Imp.	Qty.	Rate	Value
01.	Forged crank shaft of Assorted sizes	Ind.			
i.	For 3 cylinder Engine	Ind.	2500	3500	875000.00
ii.	For 4 cylinder Engine	Ind.	1500	450	675000.00
02.	Packaging materials	Ind.	LS	LS	5000.00
	Total				**1550000.00**

4. Utilities :

i	Power 7500 Kwh @ 5.00 per unit	37500.00
ii	Water	500.00
	Total	**38000.00**

5. Other Contingent Expenses [per month]

Rent	9000.00
Postage and stationery	1200.00
Telephone	1500.00
Transport charges	10000.00
Advertisement & Publicity	2000.00
Insurance and taxes	5000.00
Sales expenses	3000.00
Repair & Maintenance	4000.00
Misc. Expenses	2000.00
Consumable store, such as grinding wheel cutting tools, tool bits, boring tools, lubricants and coolant etc.	50000.00
Total	**87700.00**

Total Recurring Expenditure [per month]

Staff and labour	112700.00
Raw materials	1550000.00
Utilities	37500.00
Other contingency expenses	87700.00
Total	**1787900.00**

Working capital for three months	**5363700.00**

Total Capital Expenditure

Fixed cost	15339500.00
Working capital for 3 months	5363700.00
Total	**20703200.00**

FINANCIAL ANALYSIS

1. Cost of production [per annum]

Total recurring cost	21454800.00
Depreciation on machinery & equipment @ 10 %	1369500.00
Depreciation on tools and fixtures etc. @ 25 %	50000.00
Depreciation on office equipments etc. @ 20 %	10000.00
Interest on total capital investment @ 14 %	2898448.00
Total	**25782748.00**

Turn over [per annum]

Description	Qty.	Rate	Total
By sale of automobile crank shaft of assorted sizes :			
i. 3 cylinder engine	30000.00	700.00	21000000.00
ii. 4 cylinder engine	15000.00	950.00	14250000.00
Total			**35250000.00**

Net profit per year [Before tax]

Total turn over – cost of production

35250000 – 25782748= 9467252.00

Profit on sale

$$\frac{\text{Net profit per year X 100}}{\text{Total sale}}$$

$$\frac{9467252 \text{ X } 100}{35250000} = 26.86\ \%$$

Rate of return

$$\frac{\text{Net profit per year X 100}}{\text{Total Investment}}$$

$$\frac{9467252 \text{ X } 100}{20703200} = 45.73\ \%$$

BREAK EVEN POINT

Fixed Cost

Depreciation on machinery and equipment tools, fixtures & office equipments etc.	1429500.00
Rent	108000.00
Interest on total investment	2898448.00
40 % of salary and wages	540960.00
40 % of other contingent expenses & utilities excluding the rent	560160.00
Total	**5537068.00**

B.E.P.

$$\frac{\text{Fixed cost}}{\text{Fixed Cost + Net Profit}} \text{ X } 100$$

$$\frac{5537068}{5537068 + 9467252} \text{ X } 100 = \mathbf{36.9}\ \%$$

ADDRESSES OF MACHINERY SUPPLIER

1. M/s BFW Pvt. Ltd., Tunkur Road, Banglore.
2. M/s HMT Pvt. Ltd., E4-30, Arera Colony, Bhopal.
3. M/s A K Enterprises, 2/1-44, Pritibimb, HIG, Near NIT Garden, Trimurti Ngr., Nagpur – 440 022.