



MODEL PROJECT REPORT



PROJECT REPORT ON ARTIFICIAL DENTURES AND ALLIED ITEMS

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Project on Artificial denture, teeth, crowns & bridges and allied items

(A) INTRODUCTION:

Dentures, or false teeth, are fixed or removable replacements for teeth. Tooth replacement becomes necessary when the tooth and its roots have been irreparably damaged, and the tooth has been lost or must be removed. Dentists have long known that a missing permanent tooth should always be replaced or else the teeth on either side of the space gradually tilt toward the gap, and the teeth in the opposite jaw begin to move toward the space.

There are several standard forms of tooth replacement in modern dentistry. A full denture is made to restore both the teeth and the underlying bone when all the teeth are missing in an arch. A smaller version is the fixed partial denture, also known as a fixed bridge, which can be used if generally healthy teeth are present adjacent to the space where the tooth or teeth have been lost. The partial is anchored to the surrounding teeth by attachment to crowns, or caps, that are affixed to the healthy teeth. A removable partial denture is used to replace multiple missing teeth when there are insufficient natural teeth to support a fixed bridge. This device rests on the soft tissues of the jaws, and is held in place with metal clasps or supports. Dental implants are the latest tooth-replacement technology. They allow prosthetic teeth to be implanted directly in the bones of the jaw.

The proposed project is meant to manufacture Artificial Teeth, Dentures and Allied items like Crowns, Bridges & Dowel Pins etc. In addition to looks, health consciousness and awareness about the utility of artificial teeth in case of teeth fall and removal due to some medical problems has made the use of artificial teeth & dentures more popular in the present times. The unit will also run a research clinic along with the production of above mentioned to keep themselves current with the prevailing problems of the patients and to find out the solutions to the patients requirement.

(B) MARKET POTENTIAL:

The global dental market is growing at a rate of CAGR 5% in the last five years with the Asian markets showing highest growth of 10% followed by the US at almost half the rate of 5.5%

With over 5000 dental laboratories, 297 dental institutes, the Indian dental market is vast and it is predicted that India will be the single largest country market for dental products and materials. The dental market is expected to have a growth rate of 20 to 30 percent, with investment groups building multispecialty hospitals offering general dentistry and specialist treatments. The current

dentist to population ratio in urban area is 1:9000 and in rural areas it is 1:200000. The value of dental equipment and laboratories market itself is about US\$ 90 million annually.

In the last decade the dental services scenario in India has vastly improved due to:

- Growing Healthcare Awareness Better Economic Growth
- Increased Healthcare Expenditure
- Investor friendly Government Policies
- Reduction on Customs Duty

A large portion of dental products are imported into the country. About 85% of India's annual requirement is supplied by Germany, USA, Italy, Japan and China. Most of the imports are in the implants segment. Foreign companies are investing in the Indian dental equipment market by establishing their production units in India. India is rapidly becoming a manufacturing hub for supplying dental equipment and material to less developed countries such as Pakistan, Africa, Sri Lanka and parts of the Middle East.

Oral Care Infrastructure

99% of the dental market in India is private. Most practices in India are Solo with multi-operations. Several large multi national players such as Apollo Group, Wockhardt, Fortis are setting up a chain of dental clinics to tap into this rapidly growing dental market. Over 90% of the dentists work in and around major cities. As job opportunities in both the public and private sector are relatively less, most dentists set up their own private clinic. Every year approx. 12,000 to 15,000 new practices start in the country.

Dental Laboratory/Dental Technician

There is a greater demand than supply of dental technicians in India. Currently there are about 5000 dental laboratories yet only 32 colleges which offer diploma courses for the post of a dental technician. More colleges are now offering the course to match the growing demand.

(C) BASIS & PRESUMPTIONS:

Efficiency & working hours considered	8 hours. Single shift working basis, at 75 % efficiency capacity utilization (25 working days a month)
Time period for achieving full/ envisaged	Approx. 1 & a ½ Years

capacity utilisation	
Labour Wages rate	Un-skilled worker @ Rs. 110 /- per day, Skilled worker @ Rs 150 /- per day
Interest rates for fixed capital	11 %
Interest rates for working capital	11 %
Payback period for the project :	Around 4 years at 80% capacity utilisation.
Land & construction cost OR rental value per month (Approximate details.)	Rental Value of the Built-up Area consisting of 4 rooms & a Store - Rs. 10000/- P.M.
Quality standards	As per ISO 10139-1:2005

(D) IMPLIMENTATION SCHEDULE:

TASK	MONTH					
	1.	2.	3.	4.	5.	6.
1. Preparation of Project Report/ Business Plan	X					
2. Filing of EM-I	X					
3. Selection of site	X					
4. Statutory clearances/ licenses	X	X				
5. Submission of Term/ Working capital loan applications		X				
6. Loan sanction		X	X			
7. Negotiations & securing possession of land/ Rental premises	X	X				
8. Building construction	-	-	-			
9. Tie up for supply of utilities (power, water etc.)		X	X			
10. Placing orders for Machinery			X			
11. Receipt & Installation of Machinery				X	X	
12. Recruitment of key manpower/ labour				X	X	
13. Procurement of Raw materials & Trial production				X	X	
14. Commencement of commercial production & Filing of Udyog Aadhaar memorandum					X	

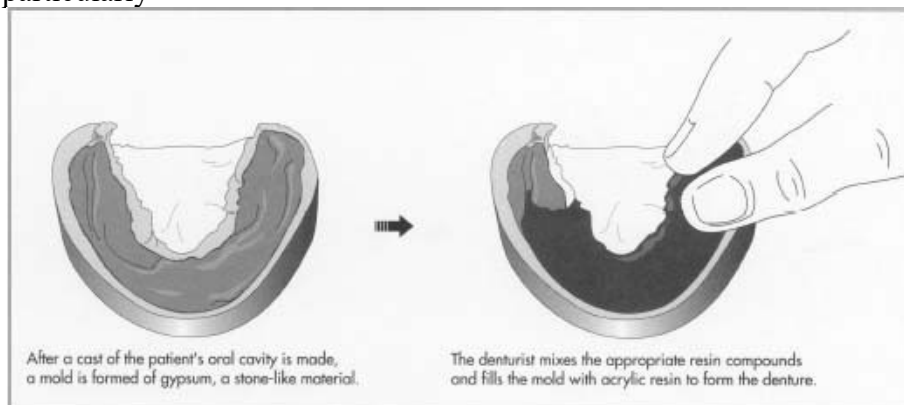
(E) TECHNICAL ASPECTS:

Modern technology has offered considerable advances in the materials used to make artificial teeth and improved techniques for affixing them in the mouth. Synthetic plastic resins and lightweight metal alloys have made teeth more durable and natural looking. Better design has resulted in dentures that provide more comfortable and efficient chewing. In the 1980s technology was developed to create the next generation of dentures, which are permanently anchored to the bones in the jaw. These new dentures, known as dental implants, are prepared by specialized dentists called denturists.

Raw Materials

Teeth

Most artificial teeth are made from high quality acrylic resins, which make them stronger and more attractive than was once possible. The acrylic resins are relatively wear-resistant, and teeth made from these materials are expected to last between five and eight years. Porcelain is also used as a tooth material because it looks more like natural tooth enamel. Porcelain is used particularly



for upper front teeth, which are the most visible. However, the pressure of biting and chewing with porcelain teeth can wear away and damage natural teeth. Therefore, porcelain teeth should not be used in partial dentures where they will contact natural teeth during chewing.

Mounting frame

Artificial teeth are seated in a metal and plastic mount, which holds them in place in the mouth during chewing. The mount consists of a frame to provide its form and a saddle-shaped portion that is shaped to conform to the patient's gums and palate. This design allows for comfort and optimizes the dentures' appearance. Frames are typically constructed of metal alloys such as nobilium or chromium. The latest generations of plastic materials used in dentures are virtually indestructible and can be easily adjusted or repaired with a special kit at the dentist's office. These materials are also ultra lightweight and can eliminate problems in patients who are allergic to acrylic materials or who are bothered by the metallic taste left by a metal frame.

Design

Every individual's mouth is different, and each denture must be custom designed to fit perfectly and to look good. The latest methodology used in denture design, known as dentogenics, is based on research conducted in Switzerland in the early 1950s, which developed standards for designing teeth to fit specific smile lines, mouth shapes, and personalities. These standards are based on such factors as mouth size and shape, skull size, age, sex, skin color, and hair color. For example, through proper denture design, patients can be given a younger smile by simply making teeth longer than they normally would be at that patient's age. This rejuvenation effect is possible because a person's teeth wear down over time; slightly increasing the length of the front teeth can create a more youthful appearance.

Manufacturing Process Out-line :-

CROWNS & BRIDGES

Before duplicating, the master cast it is disinfected with U.V. chamber & autoclave all the instruments.

Prepare the master cast by duplicating the model with silicone gel material in borosil duplicating flask. See all the undercut by surveyor.

The abutment teeth should be parallel to each other. This is done by surveying instrument. Design the master cast with marker. Wax pattern is made on the master cast with inlay wax. Now wax pattern cast is fixed in the sprue former or casting ring.

Mix the silica bonded investment material with bowl and spatula and pore the sprue former. Now the casting ring is placed in casting furnace. Here the inlay wax is completely burn out and it is converted into gas.

Without losing its temperature it is transfer into INDUCTION CASTING MACHINE. Where wironium metal is melted at temperature 1326°C and it is transferred to sprue former at temperature 1430°C without losing its temperature with in fraction of seconds in the sprue former or casting rings. The fuel used for melting the metal is oxygen gas and LPG

After cooling the casting ring it is transfer in the sand blaster machine here the investment material is broken with sand blaster with the use of air compressor. If any curing metal porosity is detected then it is corrected with laser Welding or SPOT welding. Now the casted metal is cut with high speed grinder. Finish it with small diamond burs with hanging engine then it is prepare for porcelain furnace. Firstly heat the metal in the vacuum furnace at 300°C to oxidized the metal surface then opaque material is apply on the surface metal. Now porcelain is mixed with 3 D master to match the shade of the tooth.

Apply the porcelain on the casted metal with porcelain brushes. Then it is fired in the porcelain furnace at 600°C . Voltage stabilizer controls the voltage with in limit which is used in porcelain

furnace and air conditioner (AC). Precaution – porcelain should kept under 15 - 25 ⁰C and dry place up to its use. Now the Mattel porcelain crown and bridge or metallic denture is prepared it is finish with micro motor green stone diamond burs and with porcelain burs kits then it is polish with silicones polisher packed and deliver to the dental clinics .

PROCES OF FLEXIBLE DENTURE

For flexible denture the duplicating designing surveying and pre heating are same, after burring of wax flexible denture material is mix in depends reach it at dough stage then it is packing in the flasks ring then it is placed in the flexible denture machine. It is cured at 45 ⁰C from 0 to 2 hours, then it is cool finished with micro motor , polished with acrylic polishing unit, packed and deliver to the dental clinic.

PROCESS OF TEETH MANUFACTURING

Wax teeth are prepared in the die. Fix the wax teeth in POP in flask. De-waxing is done by heating in boiling water. Wash it with hot water then pack with white acrylic polymer at dough stage. Again boil it from 0 to 20 minute at temperature from 0 to 95 ⁰C. Then cool it with tap water. De-flasking is done remove teeth from the POP. Finished with the micro motor and polished with acrylic polisher unit then tested, stored and packed for marketing.

(H) FINANCIAL ASPECTS:

1) Land & Building Requirement :

A covered area comprising of Two halls of 20'X12', Four rooms of 12'X12' and a Store of 12'X15' size : Rental Value= **Rs. 5000/- per month**

I) FIXED CAPITAL:

Machinery & Equipment:

S No.	Description	Quantity	Amount (Rs. in Lakhs)	Remarks
A	Production Machines	32 items/ Machines in 45 Nos.	12.377	Detail as per Annexure-I
B	Electrification & Installation of Machines	----	0.620	@ 5 % of Value of Machines approx.

C	Tooling & Accessories	466 Nos of 48 Types of items	3.666	Detail as per Annexure-II
D	Hand Tools	LS	0.017	
E	Office & Store Furniture & Racks	LS	0.50	
F	Pre-Operative Expenses		0.05	Preparation of Project report etc.
	TOTAL		17.23	

III) COST OF PROJECT

S.NO.	PARTICULARS	TOTAL COST	MARGIN 25%	LOAN
1	Land & Building	0.00	0.00	0.00
2	Plant and Machinery	16.68	4.17	12.51
3	Furniture & Fixture	0.50	0.13	0.38
4	Contingencies	0.00	0.00	0.00
5	Pre and Post operative exp	0.05	0.05	0.00
6	Margin for Working Capital	3.90	0.98	2.93
	Total	21.13	5.32	15.81

MEANS OF FINANCE

S.NO.	PARTICULARS	AMOUNT	0
1	Own Contribution and Unsecured loan	5.32	0.00
2	Term Loan	12.89	0.00
3	Working capital	2.93	0.00
	Total	21.13	0.00

IV) WORKING CAPITAL:

a. Personnel (Salaries & Wages PM):

S No	Designation	Nos.	Salary/Wage (p.m.)	Total Amt. (Rs.)
1	Manager	01 (Self)	15000/-	15000
2	Accountant	Part Time	2000/-	2000
3	Clerk	01	3500/-	3500
4	Skilled worker	06	4500/-	27000
5	Semi-Skilled worker	03	4000/-	12000

6	Unskilled worker (Helpers)	05	3500/-	17500
7	Sweeper	(Part Time)	500/-	500
			Sum	77500
			Benefits @ 15 % of salaries (Approx.)	12000
			Total	89500
			Say	90000
			Annual Wages	10.80lac

b. Raw Materials & Consumables (per month):-

S. No.	Description	Qty Units	Rate Rs.	Amount Rs.	Remarks
1.	Dental Stone	300 kg	40	12000	
2.	Die Stone	100 kg	100	10000	
3.	P.O.P.	700 kg	10	7000	
4.	Wax Sheet	30Box	30	1000	
5.	Alginate	15 kg	600	9000	
6.	Acrylic Heat Cure -White & Pink	40 kg	1000	40000	
7.	Cold Cure Powder - White & Pink	30 kg	900	27000	
8.	Heat Cure Liquid	20 Ltr.	500	10000	
9.	Cold Cure Liquid	20 Ltr.	500	10000	
10.	Silica Bonded Investment material	5 kg	2400	12000	Minimum order quantity
11.	Wironium Metal	1 kg	25000	25000	-do-
12.	Porcelain metal	1 kg	15000	15000	-do-
13.	Cast Partial Denture Metal	1 kg	35000	35000	-do-
	TOTAL			213000	

ii) Utilities (Per Month):-

S No	Description	Qty.	Rate (Rs.)	Amt. (Rs.)
1.	Power	3.0 KWH	4/-	4000
2.	Water	-	LS	500
3.	Hard Coal (Fuel)	1000 kg	9/-	9000
4.	Miscellaneous: LPG, Oxygen Gas, Casting Wax etc.	LS	----	50000
			Total	63500

iv) Other Contingent Expenses (Per Month) :-

S No	Description	Amt. (Rs.)
	Rent of the premises	5000
	Postage & stationery	1500
	Telephone expenses	1000

	Consumable like floor Cleaners, Disinfectants etc.	1000
	Consumables like oils & lubricants	500
	Repairs & Maintenance expenses	2000
	Transportation & Cartage expenses	5000
	Advertisement, Publicity & Travelling & Sales expenses	5000
	Insurance	1500
	Misc.	1000
	Total	23500

v) Total Recurring Expenses (per month)= 0.90+ 2.13+ 0.635+ 0.235 = **Rs. 3.9 Lakh**

Note: As per discussion with the promoter, manufacturing cycle of 10 days (i.e. 10 days Raw Material stock, 10 days Work in Progress & 10 days Finished Goods including receivables) will work smoothly. Therefore one month working capital will be sufficient to run the unit smoothly.

vi) Working Capital Requirement : Rs. 3.84 Lakh

(III) TOTAL CAPITAL INVESTMENT:

i)	Fixed capital	:	17.23	
ii)	Working capital		3.90	
			Total :- Rs.	21.13

(H) FINANCIAL ANALYSIS:

1. Cost of production (per year)

S No	Description	Rate %	Amt. (Rs. in Lakhs)
1.	Total Recurring Cost	@ Rs. 3.84 L	46.80
2.	Depreciation on production equipment (including electrification)	@ 10 %	1.30
3.	Dep. on Tooling & Accessories and Hand Tools	@ 25%	0.92
4.	Dep. on office equipment & Furniture	@ 20% approx	0.075
5.	Interest on Fixed investment & Working Capital	@ 11%	2.325
	Total		51.42

2. Turn-over /Sale (per month)

S. No.	Item	Qty Nos.	Rate Rs.	Amount Rs.	Remarks
12.	Teeth set of 28 Nos.	300X28	500	150000	(Only teeth- for Dental Clinics)

13.	Set of Anterior Teeth U/L 12 Teeth	300X12	250	75000	
14.	Set of Posterior Teeth U/L 16Teeth	150X16	300	45000	
15.	Full Teeth Set Ordinary Teeth	1000	60	60000	for student in 5 Dental Colleges in H.P.
16.	R.P.D. will be minimum of 20 Teeth U/L	50	1000	50000	
17.	C. D.	20	2000	40000	
18.	Porcelain Crown and Bridge	10	1000	10000	
19.	F.P.D. Crown and BridgeM.P.	100	250	25000	
20.	Metallic R.P.D. M.P. minimum 20 Teeth	1	10000	10000	Upto 25000/-
21.	Flexible Denture for Anterior 6 Teeth	1	10000	10000	
22.	Dowel Pin	100	200	20000	
TOTAL				495000	
L					
Sales Turn-over per annum Rs. in Lakhs				59.4	

3. Net Profit per year (H.2-H.1) = Rs. 7.98 Lakh
(before Income Tax)

4. Net Profit Ratio :- $\frac{\text{Net Profit Per Year} \times 100}{\text{Turn-over per year}} = \frac{7.98}{59.4} = 13.43 \%$

5. Rate of Return:- $\frac{\text{Net Profit Per Year} \times 100}{\text{Total Investment}} = \frac{7.98}{21.13} = 33.76 \%$
(On 100 % Capacity utilization)

6. Break-even Analysis (% age of total production envisaged):

(i) Fixed Cost : (Rs. in Lakhs)

a) Depreciations (all types)	:	2.295
b) Rent on building	:	0.60
c) Interest on investments	:	2.325
d) Insurance	:	0.18
e) 40 % of salaries & wages	:	4.32
f) 40 % of O.Es. less insurance & Rent	:	0.816
Total:-		10.536 Lakh

(ii) Net Profit per year (as at S.No. H.3) :- Rs. 7.98 Lakh

Break-even Point (B.E.P):- $\frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Net Profit}}$ = **56.9 %**

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Detail of Plant & Machinery**Annexure-I**

S. No.	Description	Qty.	Rate (Rs.)	Amount (Rs.)
1.	Porcelain Furnance	1	350000	350000
2.	Flaxible Denture Machine	1	205000	205000
3.	Hanging Engine	1	10500	10500
4.	Induction casting machine (2X6.5mm)	1	85000	85000
5.	3-D Master Shade Kit	1	90000	90000
6.	Laser Welding	1	30500	30500
7.	Surveying unit with set of surveying instrument	1	9200	9200
8.	High Speed Grinder	1	15000	15000
9.	Porcelain Bur Kit	1	8000	8000
10.	Sand Blaster	1	30000	30000
11.	Spot Welding	1	25200	25200
12.	.Light Cure unit	1	9500	9500
13.	Autoclave	1	25000	25000
14.	Casting Ring (Sprue Former)	U 1 set	6000	6000
15.	-do-	L 1set	6000	6000
16.	Blue Torch	1	2000	2000
17.	UV Chamber	1	7500	7500
18.	Duplicating Flask	1	15500	15500
19.	Polishing unit (Electro-polisher)	1	19000	19000
20.	Mandibular (Lower) Impression Trays	4	500	2000
21.	Maxillary(Upper) Impression Trays	4	600	2400
22.	Micro Motor (35000 rpm)	2	9500	19000
23.	Heavy Duty Micro motor	2	12500	25000
24.	Contra Angle Hand Piece	2	3200	6400
25.	Straight Hand Piece	2	5500	11000
26.	Air Rotor Hand Piece	2	5750	11500
27.	Air Compressor(Oil Free) – with accessories	1	18000	18000
28.	Dental Chair with all accessory	1	45000	45000
29.	Ultra Sonic De-Scalar	1	8500	8500
30.	X-Ray -Gomax	1	25000	25000
31.	R.V.G. (Radio Visible G)	1	95000	95000
32.	Apex Locator	1	20000	20000
	TOTAL	45		1237700

Annexure-II**Detail of Tools & Equipment**

S. No.	Description	Qty.	Rate (Rs.)	Amount (Rs.)
1.	Oxygen Gas Cylinder	2	12000	24000
2.	A.C. for Porcelain	1	20000	20000
3.	Voltage Stab.(AVR) for P.F.& A.C	2	8000	16000
4.	Porcelain Brushes	5	3000	15000
5.	Porcelain Carver	10	400	4000
6.	Grinding Stone	100	250	25000
7.	Rubber Wheel Silicon Polisher	100	300	30000
8.	Bowl	10	112	1120
9.	Spatula	10	107	1070
10.	Wax Knife	10	57	570
11.	B.P. Handle	10	52	520
12.	Flask Separator Knife	5	63	315
13.	Wax Spatula	10	42	420
14.	Wax Carver	10	44	440
15.	Articulator	10	550	5500
16.	Hownaw Articulator	10	760	7600
17.	Foxplain	5	115	575
18.	Spirit Lamp	5	52	520
19.	L.P.G Gas Burner	5	1000	5000
20.	L.P.G. cylinder	2	3500	7000
21.	Hot Plate	10	122	1220
22.	Cheap Blower	10	54	540
23.	Glass Slab	10	152	1520
24.	Glass Plate	10	51	510
25.	Shade Guide Kits –Vita make	5	2200	11000
26.	Brush for cold mold	10	22	220
27.	Flask No 1	10	200	2000
28.	Flask No 2	10	225	2250
29.	Flask No 3	10	250	2500
30.	Flask No 4	10	275	2750
31.	Flask No 5	10	300	3000
32.	Utensils (Open Mouthed vessels)	5	500	2500
33.	Acryliser	1	5500	5500
34.	Acrylic Policing Unit	1	8500	8500

35.	Model Trimmer	1	35000	35000
36.	Stone Bur	5	500	2500
37.	Diamond Bur	5	750	3750
38.	Metal Bur	5	500	2500
39.	Carbide Bur	5	100	500
40.	Trolley	1	8500	8500
41.	Control Box - for Air rotor	1	6200	6200
42.	Pneumatic Stool	5	2500	12500
43.	Wax Teeth Mould No.28	1	15000	15000
44.	-do- No.29	1	15500	15500
45.	-do- No.30	1	16000	16000
46.	-do- No.31	1	16500	16500
47.	-do- No.32	1	17000	17000
48.	Mould for Cardiac Wax for fixing of teeth	1	6490	6490
	TOTAL	466		366600