

**44. PROFILE ON ADJUSTABLE HOSPITAL
BEDS, STRETCHERS, AND TROLLEYS**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of adjustable hospital beds, exam beds, stretchers and trolleys with a capacity of 200 units, 150 units, 100 units, and 100 units respectively, per annum.

The major raw materials required are angle iron, mild steel strip, mild steel pipe, synthetic or natural leather and fasteners like bolt and nut, rivets which have to be imported.

The present unsatisfied demand for the proposed products is estimated at 470 for adjustable hospital bed, 688 for exam beds, 1,225 for stretcher and 1,225 for trolleys per annum.

The total investment requirement is estimated at Birr 2.94 million, out of which Birr 175.5 thousand is required for plant and machinery. The plant will create employment opportunities for 19 persons.

The project is financially viable with an internal rate of return (IRR) of 15.33% and a net present value (NPV) of Birr 1.09 million, discounted at 8.5%.

Production of adjustable hospital beds, stretcher, and trolleys have forward linkage with the development of the health sector and improve the life of the population at large. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.

II. PRODUCT DESCRIPTION AND APPLICATION

Exam beds are used in hospitals, clinics and nursing homes for diagnosing the patient. Stretchers are widely used to carry injured and sick people both inside and outside of hospitals. Trolleys are used to handle and transport various medical items like equipment, medicine, etc., within the hospital while giving medical service. Patients' bed

is used in hospitals, clinics and health centers for patients that need intensive follow up by medical personnels with in the health facilities.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The supply of these items is made available both through imports and local manufacture. Import of these items has no separate record in the Customs database; it is meshed together with assorted medical equipment imports. Even the few incidental imports by NGOs are not recorded. Duty free imports, as a rule, have no records at Customs. Iacona Engineering in Addis Ababa has, for long, been producing these items. For what ever intent or purpose, records on volume of output and distribution are not maintained.

Establishing the supply quantity by points of origin is thus rendered impossible due to the aforementioned constraints. Since the quality manufacture of these items locally bears significant impact in reducing/ curtailing imports, demand is assessed through the end use approach.

The estimated number of adjustable hospital beds, exam beds, stretchers and trolleys already in use by different health service institutions shall be presented when dealing with issue of end use in the subsequent sections of this profile.

Demand estimation, in this case by the end-use approach, is the function of three major factors whose interaction determines the volume of demand for these three items, namely;

- ✓ Government regulations and directives dictating the quantity of each of these items that should be readily available in each and every medical unit, by size, category and expected average number of patients;

- ✓ The number of currently existing health care institutions and future plans; and
- ✓ Duration of expected usage of an item before being cast away for new replacement: replacement rate.

Demand for beds, stretchers and trolleys, is generated by both public and private health institutions and even NGOs.

Prior to the presentation of government policy regarding the number of such equipment that must be available at each health unit, a presentation of data depicting the following is of paramount importance.

- Trends regarding the number of beds made available indifferent years, (Table 3.1);
- The supply gap in basic health service institutions and the required number of health units to fill the gap, (Table 3.2); and
- Demand forecast for basic health services, (Table 3.3).
-

Table 3.1

TRENDS IN NO OF AVAILABLE HOSPITAL BEDS

Description	2000	2001	2002	2003	2004
Hospital Beds	2,635	3,002	3,046	3,195	3,320

Source: IPS: Socio Economic Survey Report for Addis Ababa; 2007

Table 3.2

SUPPLY GAP IN BASIC HEALTH SERVICES

Type of Health Facility	No. of Health Facilities		Supply Shortage in	
	Present	Required	Number	%age
Clinics	507	874	67	11.7
Health Posts	42	574	532	92.7
Health Centers	26	115	83	77.4
Examination Beds	575	1,263	688	54.5

Source: IPS: Socio Economic Survey Report for Addis Ababa; 2007.

Table 3.3

DEMAND FORECAST FOR BASIC HEALTH SERVICES BY ADDIS
ABABA HEALTH BUREAU

Classifications of Health Facility	NO. of health Facilities Needed				
	2008	2009	2010	2011	2012
Clinics	700	720	741	762	784
Health Posts	700	720	741	762	784
Health centers	140	144	148	152	157
Exam/Patients beds	7,524	7,742	7,960	8,198	8,437

Source: IPS: Socio Economic Survey Report for Addis Ababa; 2007.

The government policy stipulates that any health center should have, as satellites, at least 5 health posts and all together 10 patients' beds.

Any public district hospital should have >250 hospital beds.

Private hospital should have > 30 hospital beds.

Private clinics should have trolleys and stretchers and at least 2 exam beds.

Proportion of beds to other medical equipments stands at:

2 exam beds _____ for every 20 patients' beds;

1 stretcher _____ for every 20 beds; and

1 trolley _____ for every 20 beds.

According to the above information, the number of patients' beds, examination beds, stretchers and trolleys expected to exist at present are shown in Table 3.4.

Table 3.4
EQUIPMENT ASSUMED TO EXIST PRESENTLY

Health Facility	Gov't Hospital	Pvt. Hospital	Clinic	Health Center	Health Post	Total
Beds	2,630	690	---	260	280	3,790
Exam beds	263	69	1,014	78	84	1,514
Stretchers	263	69	507	52	42	933
Trolleys	263	69	507	52	42	933

Source: IPS: Socio Economic Survey Report for Addis Ababa; 2007.

Although higher clinics are known to have beds for in-patients, there was no means of identifying which were higher clinics and which were not.

The survey report summary presented in Table 3.3 above, has illustrated the shortfalls in basic health service & facilities. It can be deduced from the Table that the number of hospital and exam beds, stretchers and trolley that should have been in use is far greater than what actually is assumed to exist.

Table 3.5 is presented to show the supply shortfall in meeting present demand for patients' beds, exam beds, stretchers and trolleys, calculated on the basis of the supply gap for basic health services presented in Table 3.2 above.

Table 3.5
PRESENT DEMAND-SUPPLY GAP

Description	Unit	Demand	Supply	Gap
Patients' bed	No	3,790	3,320	470
Exam beds	No	1,263	575	688
Stretchers	No	2,158	933	1,225
Trolleys	No	2,158	933	1,225

2. Demand Forecast

To forecast future demand for patient and examination beds, stretchers and trolleys the following factors were considered.

- The increment in number of basic health service facilities which can be obtained by deducting the number of existing such facilities from the forecast figure.
- Computing the replacement rate of the items and deriving annual replacement volume. It has been learned that usability of these items is approximately 12 years. Replacement rate is, thus, 0.8 or 8% of existing equipment.

Table 3.6 below is used to compute future demand for the items in question, and is derived by subtracting the figures in column 1 of Table 3.2 from the demand forecast presented in Table 3.3, above. For hospital beds the number which is assumed to presently exist is adapted from Table 3.4.

Table 3.6
INCREASE IN DEMAND FOR BASIC HEALTH SERVICE
INSTITUTIONS

	No. of Additional Health Facilities needed.				
Type of Facility	2008	2009	2010	2011	2012
Clinics	193	20	21	21	22
Health Posts	658	20	21	21	22
Health Centers	114	4	4	4	5
Hospital beds	3,734	218	225	231	237

Based on the increase in demand for basic health service facilities, the forecasted demand for hospital beds, stretchers and trolleys is given in Table 3.7.

Table 3.7
FORECAST DEMAND FOR HOSPITAL BEDS, STRETCHERS AND
TROLLEYS (in No)

Year	Exam beds			Stretchers			Trolleys			Patients' beds		
	New DD	Replacement	Total	New DD	Replacement	Total	New DD	Replacement	Total	New DD	Replacement	Total
2009	1,338	121	1458	1152	75	1227	1152	75	1227	3374	303	4037
2010	66	121	187	1152	75	1227	1152	75	1227	218	303	521
2011	68	121	189	57	75	130	57	75	130	225	303	528
2012	70	121	191	58	75	133	58	75	133	231	303	539
2013	73	121	194	61	75	136	61	75	136	237	303	540
2014	76	121	197	65	75	140	65	75	140	247	303	550
2015	79	121	200	68	75	143	68	75	143	257	303	560
2016	83	121	204	72	75	147	72	75	147	268	303	571
2017	86	121	207	75	75	150	75	75	150	279	303	582
2018	90	121	211	79	75	154	79	75	154	291	303	594

3. Pricing and Distribution

Current price of chrome plated metal furniture used in health service facilities fetch the following prices:

- Patients' beds..... Birr 2,400-2,600;
- Examination beds: (foam encased in synthetic leather casing) ----Birr 1,600-1800;
- Stretchers: (foam encased in synthetic leather casing).... Birr 1,200-1,400; and
- Trolleys (solid rubber-wheeled)...Birr 600-800.

These price ranges are recommended for entering the market.

To sell or distribute these items, the manufacturer should set up sales outlets and product display premises in a central area if the factory is far from town; or can sell it at the factory like any furniture factory if the location is easily reachable to prospective customers.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The demand present effective (year 2009) for Exam beds, patients' bed, Stretchers, and Trolleys is estimated at 1,458, 4037, 1,227, and 1,227, respectively. The demand becomes 200, 560, 143 and 143 exam bed, patients' bed, stretchers, and trolleys respectively by the year 2015.

Based on the demand projection, the annual production capacity of the envisaged plant is determined to be 150 exam beds, 200 patients' bed, 100 stretcher and 100 trolleys. The plant will operate single shift of eight hours a day and for 300 days a year. Production can be increased by working double shift, 16 hours a day.

2. Production Programme

Considering the gradual growth for sale of products and the time required for developing skill and operational experience, the plant is intended to start production at 75% of installed capacity in the first year. It will, then, raise its production capacity to 85% in the second year, and finally to 100% in year three and then after. Table 3.8 below shows production programme of the plant.

Table 3.8
PRODUCTION PROGRAMME

Year	Capacity Utilization (%)	Production (Units)			
		Exam bed	Patients' Beds	Stretchers	Trolleys
1	75	113	150	75	75
2	85	128	170	85	85
3 and then after	100	150	200	100	100

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The major raw materials required for the manufacture of patients' and exam beds, stretchers and trolleys are chrome-plated steel tubes, angle iron, metallic strips and plate, rectangular tubes and metal sheets. All these materials are locally available from importers.

Auxiliary materials consist of polyurethane foam, chip wood, fasteners, rollers, handles, paints, welding electrodes, artificial leather, oxygen and acetylene gases, standard bicycle parts and accessories. These raw materials can also be found locally from importers and producers since the amount required by the plant is small in which foreign purchase are not encouraging. The annual quantity of each material and associated costs are indicated in Table 4.1.

Table 4.1

RAW AND AUXILIARY MATERIALS (AT FULL CAPACITY)

Sr. No.	Description	Qty (kgs)	Cost ('000 Birr)
1	A. <u>Raw Materials</u> Chrome plated steel tubes, angle iron, metallic strips and plate, rectangular tubes, metal sheets	22,200	352
	Sub-Total		352
1	B. <u>Auxiliary Materials</u> Poly-urethane foam, chip wood, fasteners, rollers, handles, paints	Reqd	52
2	Welding electrode, artificial leather, oxy-acetylene gas	Reqd	56
3	Standard bicycle parts and accessories	Reqd	28
	Sub-Total		136
	Total Cost		488

B. UTILITIES

Utilities required by the plant consist of electricity and water. Electricity is required for supplying power to all production equipment, and to all power sockets, lighting system and other auxiliary equipment of the plant.

The total installed electric power is estimated at 60 Kw. For the plant operating single shift of eight hours a day, and 300 days a year, the total annual electrical energy requirement will be 144,000 kWh. The annual electricity bill will then be Birr 38,260.

Water is required for cleaning, drinking and other purposes. The annual water requirement is estimated at 2000 m³, and the corresponding expenditure is Birr 6500. Thus, the total annual cost of utilities is estimated at Birr 74,760. The annual requirement and cost of utilities is shown in Table 4.2 below.

Table 4.2
UTILITIES REQUIREMENT AND COST

Sr. No.	Utility	Unit of Measure	Qty.	Cost ('000 BIRR)
1	Electricity	kWh	144,000	38,260
2	Water	m ³	2000	6500
	Total			74,760

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The manufacturing of exam and patients' beds, stretchers and trolleys involve the cutting of angle iron, chrome-plated tubes, metallic strips, metal sheets, galvanized pipes to sizes, and carrying out welding operations. Then, riveting and grinding operations are performed. For hospital beds angle, irons are cut to pre-designed sizes, formed into four-

sided frames and welded to galvanized tube stands. Chip wood is cut into size of the bed and attached onto the frame. Rollers are fitted onto the four bed legs. Painting and polishing work is required to give the product final look.

Hospital stretchers are manufactured from chrome-coated tubes. All the pipe work is completed by cutting, welding and polishing. The bed is, then, padded with foam and artificial leather, and is properly attached onto the metal sheets cut to the size of the stretcher. The metal sheets are spot welded, riveted, and are welded to give necessary shape to the body of the stretcher.

Trolleys are manufactured from steel tubes and sheet steel. The steel sheet is first cut to size, welded, holes are drilled, and then polished and varnished. The frame is made of steel tubes and involves such operations as shearing of steel strips and cutting of steel tubes, and plate, tube bending, drilling holes as per the design, tube bending, drilling, brazing (hard soldering), welding, riveting, and varnishing. Roller wheel are the assembled to the trolley.

The project does not have negative impact on the environment.

2. Source of Technology

The machinery and equipment required can be obtained from the following companies.

- a) Burma Machine Tools
Guru Ram, Dass Road,
Dhandari Kalar
G.T Road, Wdhiana - 14010
India
- b) KIA Heavy Industries Corp.
15, Youido - dong, Yongdung Po-gu
Seoul, S.Korea
Tel. 02-783-9418
Fax. 02-782-4864

B. ENGINEERING**1. Machinery and Equipment**

Standard, well-known and long-time-proven metal workshop machines are required for the production of products in question. Details of these machinery and equipment are given in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT REQUIREMENT WITH ESTIMATED
COSTS

Sr. No.	Description	Qty (No.)	Cost ('000 Birr)		
			FC	LC	TC
1	Pipe bending machine	1	15	-	15
2	Electric welding machine	2	6.5	-	6.5
3	Gas welding machine	1	7.5	-	7.5
4	Bench drilling machine	1	7.5	-	7.5
5	Portable drilling machine	2	3.4	-	3.4
6	Double-end bench grinding machine	1	5.0	-	5.0
7	Hand shearing device	1	2.0	-	2.0
8	Oven	1	25	-	25
9	Hand press	2	2.0	-	2.0
10	Cleaning tanks	2	6.0	-	6.0
11	Lathe machine	1	20.0	-	20.0
12	Compressor with spray gun	1	15.0	-	15.0
13	Riveting machine	1	5.0	-	5.0
14	Hand grinding machine	2	3.0	-	3.0
15	Portable spot welding machine	1	5.0	-	5.0
16	Power saw	1	2.6	-	2.6
17	Vertical spindle drilling machine	1	10.0	-	10.0
18	Tool grinder	1	5.0	-	5.0
19	Hand tools, fitter tools and jigs	sets	10.0	-	10.0
	Sub total		155.50	-	155.50
	Bank, customs and insurance charges, freight and material handling costs		-	20.00	20.00
	Total landed Cost		155.50	20.0	175.50

Machinery and equipment listed in Table 5.1 above will enable the plant to manufacture parts and components of hospital beds, stretchers and wheel chairs. The capital outlay for plant machinery and equipment, as indicated above, is estimated at Birr 175,500, out of which Birr 155,500 is required in foreign currency.

2. Land, Building and Civil Works

Land is required to accommodate plant building, management offices, social building for workers, stores, internal roads, adequate space for expansion and other industry related activities. The total land area for the envisaged plant is estimated to be 600 m². Of this size of land, about 300 m² will be covered by different types of buildings indicated above. A 250 m² area covering building will be constructed to accommodate the store in the underground and the first floor for the production facility while the remaining area i.e. 50m² will be covered by the office building. The total construction cost assuming construction cost of birr 1,800 per m², is estimated at Birr 540,000.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 272/2002) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of

banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5000 m² the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m² the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

The land lease price in the industrial zones varies from one place to the other. For example, a land was allocated with a lease price of Birr 284 /m² in Akakai-Kalti and Birr 341/ m² in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m² for all industrial zones.

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all manufacturing projects will be located in the industrial zones. Therefore, for the this profile since it is a manufacturing project a land lease rate of Birr 346 per m² is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity,

foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.2 shows incentives for lease payment.

Table 5.2

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace Period	Payment Completion Period	Down Payment
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The period of lease for industry is 60 years.

Accordingly, the total lease cost, for a period of 60 years with cost of Birr 346 per m², is estimated at Birr 12.46 million of which 10% or Birr 1,245,600 will be paid in advance. The remaining Birr 11.21 million will be paid in equal installments with in 28 years i.e. Birr 400,371 annually.

VI. MANPOWER & TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant requires both direct and indirect manpower. The direct manpower consists of designers, operators of workshop equipment, mechanics, welders, painters. Labourers are engaged in manufacturing of the products executed by production & technical departments. The administrative activities are executed by indirect workers that include plant manager, executive secretary, heads of finance and administrations, and personnel officer, accountant and other support giving personnel.

The manpower list and the corresponding monthly and annual salaries including fringe benefits are given in Table 6.1 below.

Table 6.1
MANPOWER REQUIREMENT AND ANNUAL SALARY

Sr. No.	Description	Req. No.	Salary (Birr)	
			Monthly	Annual
A. <u>Administration</u>				
1	Plant manager	1	3,000	36,000
2	Secretary	1	900	10,800
3	Clerk	1	500	6,000
4	Cashier	1	500	6,000
5	General service	3	1,050	12,600
Sub total		7		71,400
B. <u>Production</u>				
1	Designer	2	2,400	28,800
2	Machinery operators	2	1,800	21,600
3	Welders	2	1,800	21,600
4	Painters	2	1,400	16,800
5	Manufacturing supervisor	1	1,500	18,000
6	Laborers	3	1,050	12,600
Sub total		12	-	119,400
Employee's benefit (20% of basic salary)		-	-	47,700
Total		19	-	238,500

B. TRAINING REQUIREMENT

Employees have to acquire the requisite skill and knowledge to properly operate the production machinery and equipment through short-term training. The designer, machinery operation mechanics, welders, and manufacturing supervisor will have to participate in the training programme that will be conducted for a period of 4 to 6 weeks. The manufacturing supervisor is expected to have long years work experience in similar production activities.

The training programme can be conducted in enterprises (either private or public) having wide experience in production of similar products. Other possibility is to make special arrangements with machinery supplier.

Accordingly, the training of personnel can be part of the agreement such that all the employees involved in production activities can be trained during erection and commissioning at the project site. Thus, a total of Birr 5,000 is allotted for this purpose.

VII. FINANCIAL ANALYSIS

The financial analysis of the adjustable hospital bed, stretcher, and trolleys project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity 70 % loan
Tax holidays	2 years
Bank interest	8.5%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Raw material import	90 days
Work in progress	1 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 2.94 million, of which 5 per cent will be required in foreign currency. The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST ('000 Birr)

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost
1	Land lease value	1,245.60	-	1,245.60
2	Building and Civil Work	540.00	-	540.00
3	Plant Machinery and Equipment	20.00	155.50	175.50
4	Office Furniture and Equipment	125.00	-	125.00
5	Vehicle	450.00	-	450.00
6	Pre-production Expenditure*	313.02	-	313.02
7	Working Capital	96.78	-	96.78
	Total Investment Cost	2,790.40	155.50	2,945.90

* *N.B Pre-production expenditure includes interest during construction (Birr 163.02 thousand), training (Birr 5 thousand) and Birr 145 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 1.11 million (see Table 7.2). The raw material cost accounts for 43.68 per cent of the production cost. The other major components of the production cost are depreciation, financial cost and direct labour which account for 15.85%, 11.64% and 10.25%

respectively. The remaining 18.58 % is the share of utility, repair and maintenance, labour overhead and other administration cost.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	488.00	43.68
Utilities	74.76	6.69
Maintenance and repair	8.79	0.79
Labour direct	114.48	10.25
Labour overheads	47.70	4.27
Administration Costs	76.32	6.83
Land lease cost	-	-
Total Operating Costs	810.05	72.51
Depreciation	177.05	15.85
Cost of Finance	130.06	11.64
Total Production Cost	1,117.16	100

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 113.51 thousand to Birr 366.03 thousand during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 3.34 million.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 31 \%$$

4. Payback Period

The pay back period, also called pay – off period is defined as the period required to recover the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 6 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 15.33 % indicating the viability of the project.

6. Net Present Value

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project into a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 8.5% discount rate is found to be Birr 1.09 million which is acceptable.

D. ECONOMIC BENEFITS

The project can create employment for 19 persons. In addition to supply of the domestic needs, the project will generate Birr 964.89 thousand in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. Production of adjustable hospital beds, stretcher, and trolleys have forward linkage with the development of the health sector and improve the life of the population at large.