**COST ANALYSIS OF 5000MT MULTI-**

**PURPOSECOLDSTORAGE**

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

BACHELOR OF TECHNOLOGY

IN

AGRICULTURAL ENGINEERING

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CERTIFICATE OF APPROVAL

This is certify that this project report entitled **“COST ANALYSIS OF 5000MT MULTI- PURPOSECOLD STORAGE”** Submitted by Mr. Ayan Mandal, Mr. Arijit Ghosh, Mr. ChiranjitRana& Mr. Sudip Kumar Nandi , in partial fulfillment of the requirements for the degree of BACHELOR OF TECHNOLOGY (HONS.) in AGRICULTURAL ENGINEERING is hereby approved.

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Dr.MANOJ KUMAR CHOURASIA

(Project Guide)

DEPT. OF FOOD ENGINEERING

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Dr. PARTHA SARATHI CHATTOPADHYA

(DEAN)

FACULTY OF AGRICULTURAL ENGINEERING

BIDHAN CHANDRA KRISHI VISWAVIDYALAYA

**THIS**

**PROJECT**

**IS**

**DEDICATED**

**TO**

**OUR BELOVED**

**PARENTSACKNOWLEDGEMENT**

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**PROJECT REPORT ON COST ANALYSIS OF 5000MT MULTI-PURPOSE COLD STORAGE**

**Introduction:-**

Multipurpose Cold storage industry is a very important and essential industry. In India, fruits & vegetables are produced in plenty. A large number of fruits and vegetables are exported to other countries and even in India itself fruits and vegetables are transported from one place to another. This transportation business takes some time. So, it is desirable that fruits should be kept at a place where they can remain safe, other wise a lot of its will be wasted. For this purpose, Cold Storage is used.

Inducements to build multipurpose cold storage facilities will encourage investments, reduce food wastage and furbish the supply chain in the world’s 2nd largest producer of fruits and vegetables. With a view to obtaining faster development of cold storage capacity and to motivate entrepreneurs to invest more in this sector a new credit-linked capital subsidy scheme for construction of cold storages and warehouses. The scheme would be implemented by NABARD/NCDC/NHB. National Horticulture Board is providing capital subsidy to budding entrepreneurs for construction, expansion, upgradation and modernization of cold storages for horticulture products. This scheme is to assist setting up of cold storages in the country for diminishing post harvest losses. Cold Storages including controlled Atmosphere (CA) and Modified Atmosphere (MA) Stores, pre-cooling units and other Storages for other vegetables etc.

**Project site/Land details:-**

|  |  |
| --- | --- |
| Proposed project Area(sq.mt) | 3681.27 Sq. Mt. |
| Pin Code | 721507 |
| Habitation | Ghoradhara |
| Urban body | Jhargram |
| Block | Jhargram |
| Sub-Division | JhargramSadar |
| District | Jhargram |
| State | West Bengal |
| Location Longitude, Latitude &  Altitude | 22.4550°N, 86.9974°E |
| Total Area proposed for project (ha) | 0.368 |

**Project Site Connectivity:-**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Road  connectivity-  Distance from | |  | | --- | | National Highway | | State highway | | |  | | --- | | NH-6 | | SH-5 | |
| Rail connectivity | Jhargram Railway Station | 500 m apart from Jhargram Railway Station |
| Air connectivity | No |  |
| Water ways | Kanswabati | 2Km apart from river |
| Market connectivity |  | 500 m apart from market |

**MARKET POTENTIAL**

Cold storages are essential for extending the shelf life, period of marketing, avoiding glut, reducing transport bottlnecks during peak period of production and maintenance of quality of produce. The development of cold storage industry has therefore animportant role to play in reducing the wastages of the perishable commodities and thus providing remunerative prices to the growers.

**BASIS AND PRESUMPTIONS**

(i) The project is based on an average 90 percent capacity utilisation, three shifts working per day and 300 working days per annum.

(ii) The project is based on renting of the chambers for the growers, traders and industry.

(iii) The rate of interest has been taken @ 18 percent on an average.

(iv) Labour wages have been taken as per market rates.

(v) 25 percent margin money has been taken both for fixed investment and working capital.

(vi) For economic viability an Ice Block Manufacturing Unit has also been included in the project.

**IMPLEMENTATION SCHEDULE**

The approximate time required for various activities is given below. However, it may vary from place to placedepending upon the local circumstances and on the enthusiasm of the entrepreneurs:

Selection of Site 1 month

Preparation of Project Report1 month

Registration as SSI/Other legal formalities 15 days

Availability of Finance 3 months

Machinery procurement,erection and commissioning 2 months

Trial Run 1 month

**TECHNICAL ASPECTS**

**Process of Manufacture:-**

At present there are two popular refrigerants in the market. One is Freon and the other is Ammonia. Ammonia and Freon compressors are being manufactured indigenously. Ammonia refrigerant is cheaper, easily available and is of high latent heat of evaporation but it has certain disadvantages like being highly toxic in nature. It also forms explosive mixture when mixed with oil containing high percentage of carbon.Rooms of different temperature must be separated by insulation and should be protected from moisture. Whenever possible, one coating of foam glass with vapour proof material should be used against the outside wall.

While fixing the insulation, the points to be kept in mind are:

(a) The surface to be insulated should be completely moistureproof and be reasonably even, free of lump or hole plaster on the walls. The ceiling must be

cured before surface is insulated.

(b) Precaution may be taken to ensure that the moisture from outside can not penetrate through the wall, ceiling or floor.

(c) The partition wall between two chambers should be insulated both sides.

Fruits and vegetables which are to be kept in cold storage, are sorted out and the bad ones removed. The sorted material is packed preferably in wooden/ plastic carton boxes and then kept in cold storage chambers. The temperature and humidity is to be maintained depending upon the commodity kept in the store. The requirements for successful storage of important fruits and vegetables are shown in Table I and II.

**Month Wise Operational Chart Number Of Days Of Operation**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Product | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1. Potato |  | IN | -- | -- | -- | -- | -- | OUT |  |  |  |  |
| 2. Onion | OUT |  |  |  |  |  |  |  |  | IN | -- | -- |
| 3. Cabbage | IN | -- | -- | -- | -- | OUT |  |  |  |  |  |  |
| 4. apple |  |  |  |  |  | OUT |  |  |  | IN |  |  |

|  |  |  |
| --- | --- | --- |
| **Name of Fruit** | **Storage Temp.(°F)** | **Cold Storage Life(in week)** |
| **1. Potato** | 40-55 | 5-10 Months |
| **2. Onion** | 32 | 1-8 Months |
| **3. Cabbage** | 32 | 5-6 Months |
| **4. apple** | 30-40 | 1-12 Months |

Motive Power 250 HP

**Pollution Control**

There are no harmful effluents in the process. However, NOC may be taken

from the concerned State Pollution Control Board. Energy Conservation

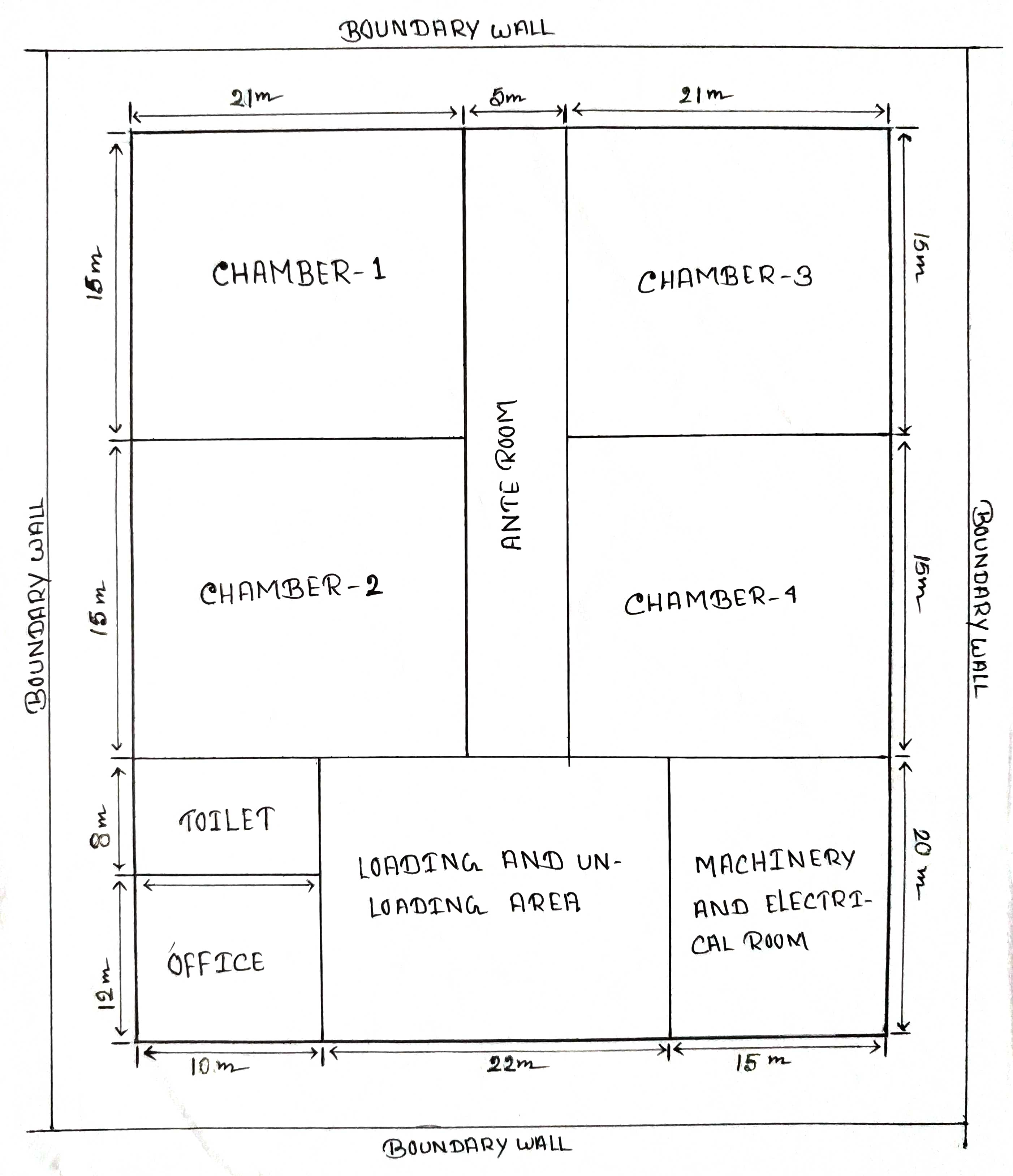
Proper insulation should be given to avoid loss of heat/temperature.

Quality Control and Standards The Directorates of Agricultural Marketing and Inspection in State Governments and Govt., of India areregulating cold storage industry under Cold Storage Order, 1980, promulgated under Essential Commodities Act, 1955 all over India except in the States of UP, West Bengal, Punjab and Haryana and provisionally in Bihar. State Governments are regulating the industry in their respective States under their respective Acts/Orders. The Ministry of Agriculture has now repealed the Cold Storage Order and advised the State Governments also to repeal it totally. With the repeal of this Order, the cold

storage industry will now be able to enter the market free from all kinds of

administrative interference.

**DESIGN:**



**Structure of a multipurpose cold storage**

Construction Features: The general convention of conventional construction is as follows:

Foundation:Superstructure and Foundation (which may be conventional Footing Type, Pile Foundation, Raft Foundation etc) to be designed by qualified & licensed structural / civil engineer. The design shall meet the BIS standards and relevant seismic zone norms for earthquake proof designs.

Walls:230 mm Brick walls / solid concrete blocks with sand- cement plaster. However, in RCC structure or pre-fabricated structure insulated panel boards may also be provided in place of masonry walls.

Roof:RCC slabs or Truss Roof with G.S / Pre-coated G.S.Sheet cover. RCC slab to have proper water proofing with reflective colour paint / China mosaic finish. Slab to have proper slope for rain water drainage.

In case of truss roof, provision to be made for fixing insulated panels on the ceiling & supporting of cooling units from the trusses (alternatively cooling units can be supported on floor mounted frame structure on top floor).

Provision for FRP sheets for natural lighting to be made in roof sheeting at certain locations. For ventilation of attic, provision of ridge monitor or turbo ventilators (which require no electric power) can be made. Alternatively roof can also be designed by installing insulated roof panels with proper slope & sealing of longitudinal & lateral joints. The work to be handled by experienced agencies to ensure a trouble free roof structure. The roof may be kept walkable for maintenance.

However, in case of Steel / Pre-engineered construction the steel structure components / construction sections are fabricated conforming to relevant codes and standards of ASTM/BIS as applicable. The walls ceiling and partition are generally constructed of Insulated metal skin composite structural panels with core insulation of polyurethane. The insulation requirements or equivalent ćUĈ values are mentioned in the subsequent para. The insulated panels are generally 1 to 1.2 Mtr. wide and in single piece and are extended from floor to the ceiling

and held together by fasteners and fixing system. All the joints are properly sealed with silicon sealants for leak proof joint.

Floor:The floor comprises of base concrete, in cold stores with suitably lower levels in cold chambers. The level difference between cold chambers and ante room to be equal to the thickness of floor insulation plus the layer of PCC or tremix finish,

Ante Room:The cold rooms should be provided with at least one common ante room area to avoid direct infiltration of warm ambient air into the cold rooms. The ante room also serves as warm-up chambers for produce stored so they do not get wet due to condensation on unloading for dispatch.

Process Grading and Sorting Area: The process area will be maintained at comfortable conditions by using evaporative cooling particularly in dry areas. In high humidity areas, air-conditioning with humidifiers control to maintain temperature range of 20uC to 24uC can be provided which would be suitable for handling of fresh fruit and vegetable produce. Dock shelters will be provided in the dispatch areas of pre-cooled / chilled product.

Grading & Sorting Line:Suitable mechanized sorting; grading, washing and packing line should be provided.

Palletization & Strapping Facility:Pallets / Racks for bulk storage in bags or in bins are to be provided. Moreover, sufficient space for Drive in / Drive through Racks need to be provided, if such storage systems are provided.

Pallet Jack & Fork Lift:Fork lift need to be provided for movement of palletized crates. High reach Stackers / pallet Jack are needed depending on height of palletization.

Bins, Crates, Pallets and Racks: These are required in sufficient numbers for storing and vertical stacking of11produce. Bins and Crates may be replaced by ventilated CFB boxes provided they meet the commodity storage requirements and in view of the period of storage.

Strip curtains for cold rooms and Air Curtains for external outlets/ inlets: Strip curtains are quite common for reducing infiltration of air during loading/ unloading. Air curtains need power for operation but are more effective if properly installed.

Dock: Loading & unloading dock shall be designed with RCC slab roof or sheet roofing. However the machine roof can have RCC slab-roof to accommodate the evaporative condensers, pump sets, water tank, water softener etc. The dock area to accommodate suitably sized office & toilet for staff &labour.

Ancillaries: Underground fresh water storage, storage for fire fighting, water supply & sanitary arrangements, compound wall / fencing, main gate, security, small canteen / electrical sub-station & D.G. set platform, roads & parking place for vehicles etc. Green landscaping with benches for labourers is desirable.

**HEAT LOAD CALCULATION:-**

HEAT TRANSFER THROUGH THE WALLS:

If the steady state flow is considered than, the heat flow is

Q = UA (To – Ti) W

Where,

U --- Over all heat transfer coefficient (W/° C)

A --- Surface area through which heat is transferred ( )

To --- Temperature of outside air (°C)

Ti --- Temperature of inside storage space( ° C)

The overall heat transfer coefficient is given by

U=

Where,

ho ---- heat transfer coefficient on the out or surface( W/° C)

hi ---- heat transfer coefficient on the inner surface ( W/° C )

X1, X2 --- Thickness of wall and insulating material respectively (m).

K1, K2 --- Thermal conductivity of wall and insulating materials (W/mk)

With thick wall and low conductivity, the resistance X/K makes U so small that 1/hi and 1/ho have little effect and can be omitted from the calculation. The values of U for different types of walls and ceilings various from 1.00 to 4 Kcal / .hr. °C

Let, wall height =14m

\*out side wall surface area = (21x14)= 294

Another side out side surface area = (15x14)= 210

Total out side wall surface area = (294+210)x4 =2016

\*Ambient temperature (To) = 30° c

\*Cold storage temperature (Ti) = 7° c

\*Ambient temperature (To) = 25°c………….( Anti room side )

\* Thickness of the concrete = 0.2 m

\* Thermal conductivity of the brick = 0.87W/mk

\* Thickness of the insulator = 0.15 m

\* Thermal conductivity of the cement plaster = 0.036W/mk

Overall heat transfer coefficient

U=

U= 0.214W/° C

Therefore heat transfer through building material

Q=0.214 x 2016x (30-7) …………( through out side wall )

= 9922.75 W

Surface area area of Anti room side wall =(15x14)= 210

Total surface area of Anti room side wall = 210x4= 840

Therefore heat transfer through building material

Q= 0.214x840x(25-7)……………..( through anti room side wall )

= 3235.68 W

Total heat transfer through walls = 9922.75+3235.68

= 13158.43W

**HEAT TRANSFER THROUGH CEILING:**

\* Surface area = A = (21x15)=315

Total surface area of ceiling = 4x315

= 1260

Therefore heat transfer through ceiling material, can be generally taken as 20% more thanwall overall coefficient

Heat transfer through ceiling

Q = (0.214x1.2) x 1260 x (30-7)

= 7442.06 W

**HEAT TRANSFER THROUGH FLOOR:**

\* Surface area = A = (21x15)=315

Total surface area of ceiling = 4x315 = 1260

Heat transfer through floor

Q = (0.214x1.2) x 1260 x (30-7)

= 7442.06 W

**Total heat transfer = Heat transfer through walls +ceiling + floor**

= 13158.43+7442.06+7442.06

= 28042.55 W

Cost on insulating material, conductivity, Quality and life of the material. The most commonly used building and the insulating materials with their properties are presented in the appendix.

**PRODUCT LOAD:**

Product cooling = (Weight of the potato) x (Specific heat of potato)

(Temperature difference)

= 50000x3.43 x(30-7)

= 3944500 KJ/24h = 45653.94 W

Product cooling = (Weight of the onion) x (Specific heat of onion

(Temperature difference)

= 50000 x 3.77 x (30-7)

= 4335500 KJ/24h = 50179.39 W

Product cooling = (Weight of the cabbage) x (Specific heat of cabbage)

(Temperature difference)

= 50000x 3.94 x(30-7)

= 4531000 KJ/24h = 52442.13 W

Product cooling = (Weight of the apple) x (Specific heat of apple)

(Temperature difference)

= (50000) x (3.64) x (30-7)

= 4186000 KJ/24h = 48449.08 W

Box heat load (Hard wood) = (weight of the box) (sp heat of box)

(temp. difference)

= (0.002 m3 x 8000 boxes x 720 kg/m3 ) (0.571) (30 – 7)

= 151292.16 Kcal/24h = 635427.07KJ/24h

= 7354.48 W

Total product load =45653.94+50179.39+52442.13+48449.08+7354.48

= 204079.02 W

**RESPIRATION LOAD DURING COLD STORAGE:**

Respiration heat load = wt. of the total product x heat of respiration

= 200 tonnes x 700 Kcal/ton/24 h

= 140000 Kcal/ton/24 h = 588000 KJ/24h= 6805.55 W

**Internal heat load – People:-**

Next we’ll calculate the internal loads from people working in the cold room, as people generate heat and we need to account for this.

We’ll estimate 2 people working in the store for 4 hours a day and we can look up and see at this temperature they will give off around 270 Watts of heat per hour inside.

We’ll use the formula:

**Q = people x time x heat**

* Q = W/day
* people = how many people inside
* time = length of time they spend inside each day per person (Hours)
* heat = heat loss per person per hour (Watts)

Calculation:

Q = people x time x heat   
Q = 2 x 4 hours x 270 Watts  
Q = 2160 W/day

Total internal heat load for people= 4×2160=8640 W/day

Internal heat load – Lighting

Then we can calculate the heat generated by the lighting, this is fairly simple to do and we can use the formula

**Q= lamps x time x wattage**

* Q = W/day
* lamps = number of lamps within the cold room
* time = hours of use per day
* wattage = power rating of the lamps

If we have 3 lamps at 100W each, running for 4 hours a day, the calculation would be:

Q= lamps x time x wattage   
Q= 3 x 4 hours x 100W   
Q= 1200 W/day

Total internal heat load for lighting = 4×1200 = 4800 W/day

Equipment load – fan motors

Now we can calculate the heat generation of the fan motors in the evaporator. For this we can the use the formula of:

**Q = fans x time x wattage**

* Q = W/day
* fans = the number of fans
* time = fan daily run hours (hours)
* wattage = the rated power of the fan motors (Watts)

In this cold room evaporator we’ll be using 3 fans rated at 200W each and estimate that they will be running for 14 hours per day.

Calculation:

Q = fans x time x wattage   
Q = 3 x 14 hours x 200W   
Q = 8400W/day

Total equipment load for fan motors = 4×8400=33600 W/day

**Total heat load = Heat transfer through surface + Product cooling + Respiration load + Internal heat load for People + Internal heat load for Lighting + Equipment load for fan motors =** 28042.55+204079.02+ 6805.55 + 8640 + 4800 + 33600= 285967.12 W

**Miscellaneous load calculation:**

Infiltration load: Assuming 10% of total heat load= 285967.12 × 0.1 = 28596.712W

**Now, Total Heat load =** 285967.12 + 28596.712 = 314563.832 W

\*Including 10 % of the total heat load as a safety factor, the overall heat load

=314563.8321.1

= **346020.215** W

**TOTAL HEAT LOAD CALCULATION:**

\*One ton of refrigeration = 3520 W

Therefore, refrigeration required = 346020.215/ 3520

= 98.30 tons of refrigeration

So based on this cooling load calculation we can select the refrigeration unit capacity for particular product to be stored.

**Financial Aspects:-**

**A. Fixed Capital**

|  |  |  |  |
| --- | --- | --- | --- |
| i) Land and Building | Area | Rate (In Rs.) | Total (In Rs.) |
| Land 3681.27 sq.mtr.@ Rs. 12224 per sq. mtr |  |  | 44999844.5 |
| (a) Cold Storage Chambers (21x15x4) | 1260 Sq.Mt | 11750/Sq.Mt | 14805000 |
| (b) Sorting Verandah (22x20) | 440sq.Mt. | 5500 sq.Mt | 2420000 |
| (c) Insulation on Walls, Ceiling Floor. | 1410 Sq. Mt | 7500/ Sq.Mt | 10575000 |
| (d) Machine Room 20m × 15m | 300 sq.mt. | 5500/Sq. Mt. | 1650000 |
| (e) Toilet 8x10 | 80sq.mt. | 1000/sq.mt | 80000 |
| (f) Bore Well |  |  | 120000 |
| (g) Administration 12x10 | 120sq.mt. | 5500 sq.mt. | 660000 |
|  | Total |  | 30310000 |
|  | Total Land & Building |  | 75309844.5 |

**(ii) Machinery and Equipment**

|  |  |  |  |
| --- | --- | --- | --- |
| SL NO. | Particulars | Qty. | Amount(Rs) |
| i) | Super freeze Refri-compressor Model SRA-4000 | 1 No |  |
| ii) | 100 HP screen protected induction Motor | 1 No |  |
| iii) | Suitable hand operated oil immersed starter/ motor starter | 1 No |  |
| iv) | Ammonia oil separator Size 18" × 48" | 1 No |  |
| v) | Atmospheric Type  Ammonia condenser | 12 No |  |
| vi) | Valves and fittingsfor the condenser | 1 lot |  |
| vii) | Ammonia Air Cooling units | 16 No |  |
| viii) | Ammonia Receiver size 16"×24" without standard  Ammonia Fittings | 1 No | 90 Lakhs |
| ix) | Valve and fittings for the above Receiver | 1 lot |  |
| x) | Instrument comprising of dry and wet thermometers | 6 No |  |
| xi) | Ammonia valves and fittings | 1 lot |  |
| xii) | 5 HP mono block centrifugal pump set for condensers water circulation | 2 No |  |
| xiv) | Insulated cold storage door made of wooden frame with GI Sheets Metal Cladding. Hinger Latches, Push Bar Size 28" × 36" × 4" thick | 4 No |  |
| xv) | Slide rail for compressor motor | 2 No |  |
| xvi) | Ammonia pipe to interconnect high and low side equipment of refrigeration machine | 1 lot |  |
| xvii) | Water pipe lines and fitting | 1 lot |  |

|  |  |  |  |
| --- | --- | --- | --- |
| SL NO. | Particulars | Qty. | Amount(Rs) |
| 1 | Super freeze refrigeration compressor | 1 No |  |
| 2 | 75 HP screen protected induction motor | 1 No |  |
| 3 | Suitable hand operated oil immersed starter/motor starter | 1 No |  |
| 4 | Super freeze refri–compressor | 1 No |  |
| 5 | 50 HP screen protecteddelivery induction motor | 1 No |  |
| 6 | Suitable hand operated oil immersed starter | 1 No |  |
| 7 | Ammonia oil separator (Size 16"×48") | 12 No |  |
| 8 | Atmospheric type  Ammonia condensers | 15 No |  |
| 9 | Valves and fitting for the condenser | 1 lot |  |
| 10 | Cooling oil trunk type duly tested by hydraulic pressure | 1 No |  |
| 11 | Ammonia receiver size 18" × 24" | 1 No |  |
| 12 | Valves fitting for above receiver | 1 No |  |
| 13 | Hand hoist and trolley wheel fitted both sides | 1 No |  |
| 14 | Mono block agitator fitted with suitable electric motor | 1 No |  |
| 15 | Condump with stand | 1 No | 85 Lakhs |
| 16 | Ice can size 11”×22” ×48” from G.I. Sheet16 gauges | 540 Nos |  |
| 17 | Ammonia valves and fitting | 1 lot |  |
| 18 | Ammonia gas charging pipe | 1 No |  |
| 19 | 5 HP Mono block centrifugal pump set for condenser water circulation | 2 No |  |
| 20 | Material of freezingbring tank | 1 lot |  |
| 21 | Ammonia pipe for inter-connection | 1 lot |  |
| 22 | Water pipe lines fittings | 1 lot |  |
| 23 | M.S. slide rail for compressor motor | 4 No |  |
| 24 | Water hose pipe | 1 lot |  |
| 25 | Instrument Brine thermometer and hydrometer | 1 No |  |
|  | Excise duty and CST |  | 9.14 Lakhs |
|  | DG set of 125 KVA |  | 3.70 Lakhs |
|  | Transformer and other electrical expenses |  | 3.00 Lakhs |
|  | Electrification and Installation charges @ 10% of cost of Machinery |  | 7.05 Lakhs |
|  | Total Cost of Plant and Machinery |  | 197.89Lakhs |
|  | Office Furniture and Equipment |  | 1.50 Lakhs |
|  | Total |  | 199.39 Lakhs |
|  | iii. Pre-operative Expenses |  | 2.50 Lakhs |
|  | Total Fixed Cost (i+ii+iii) |  | 954.98 Lakhs |

**B. Working Capital (per month)**

**i) Personnel**

|  |  |  |  |
| --- | --- | --- | --- |
| Designation | Number | Salary/month(Rs) | Total(Rs) |
| 1.Manager | 1 | 40000 | 40000 |
| 2. Maintenance Supervisor | 1 | 18000 | 18000 |
| 3.Storekeeper | 1 | 12000 | 12000 |
| 4.Accountant | 1 | 25000 | 25000 |
| 5. Skilled Workers | 4 | 10000 | 40000 |
| 6.Unskilled Workers | 15 | 8000 | 120000 |
| 7.Watchman | 2 | 10000 | 20000 |
| Total |  |  | 275000 |
| Or Say |  |  | 2.75Lakhs |

|  |  |
| --- | --- |
| ii) Raw Material | Total(Rs) |
| 1. Water 9000 KL @ Rs. 4/KL | 36000 |
| 2. Add back of Salt and Ammonia | 15000 |
| Total | 51000 |
| or Say | 0.51 Lakhs |

|  |  |
| --- | --- |
| iii) Utilities | Amount(Rs) |
| Power 250 HP 80% of 200×24×30 KWH @ Rs 5.0 unit | 576000 |
| Fuel | 20000 |
| Total | 5.98 Lakhs |

|  |  |
| --- | --- |
| iv) Other Contingent Expenses | Amount(Rs) |
| 1. Postage and stationery | 2000 |
| 2. Telephone, Wifi | 3000 |
| 3. Consumable stores | 16000 |
| 4. Repair and maintenance | 20000 |
| 5. Transport | 30000 |
| 6. Insurance | 36000 |
| 7. Miscellaneous | 20000 |
| Total | 127000 |
| or Say | 1.27 Lakh |
| **\*Working Capital (per month) =10.51 lakh**  **Working Capital for 2 months = 21.02 lakh** |  |

**C. Total Capital Investment**

|  |  |
| --- | --- |
|  | Amount(Rs) |
| 1. Fixed Cost | 954.98 |
| 2. Working Capital for 2 Months | 21.02 |
| Total | 976 Lakh |

**FINANCIAL ANALYSIS**

|  |  |
| --- | --- |
| (1) Cost of Production (per annum) | Rs(Lakh) |
| 1. Total recurring cost | 67.56 |
| 2. Depreciation on building @ 8 percent/annum | 24.25 |
| 3. Depreciation on machinery @ 10 percent/annum | 19.79 |
| 4. Depreciation on Furniture @ 20 percent/annum | 0.30 |
| 5. Interest on total investment @ 18 percent/annum | 175.68 |
| Total | 287.58 |

|  |  |
| --- | --- |
| (2) Turnover (per annum) | Total (Rs.) |
| 1. 5000 M.T. Vegetables, fruits and chemicals@ Rs 2500 M.T. | 150.00 Lakhs |
| 2. Ice Blocks 5500 M.T. @ Rs 1000/M.T | 55.00 Lakhs |
| Total Turnover | 205.00 Lakhs |

(3) Net Profit (per annum)= 80.00 Lakhs

(4) Net Profit Ratio= = 39.02 %

(5) Rate of Return=

**(6) Break-even Point**

|  |  |
| --- | --- |
| Fixed Cost (per annum) | Amount (Rs. In Lakhs) |
| Depreciation on Machinery | 19.79 |
| Depreciation on Furniture | 0.3 |
| Interest on Total investment | 175.68 |
| 40% of Salary and Wages | 13.2 |
| 40% of other expenses | 6.09 |
| Total | 215.06 |

B.E.P.=

= = 40.53%