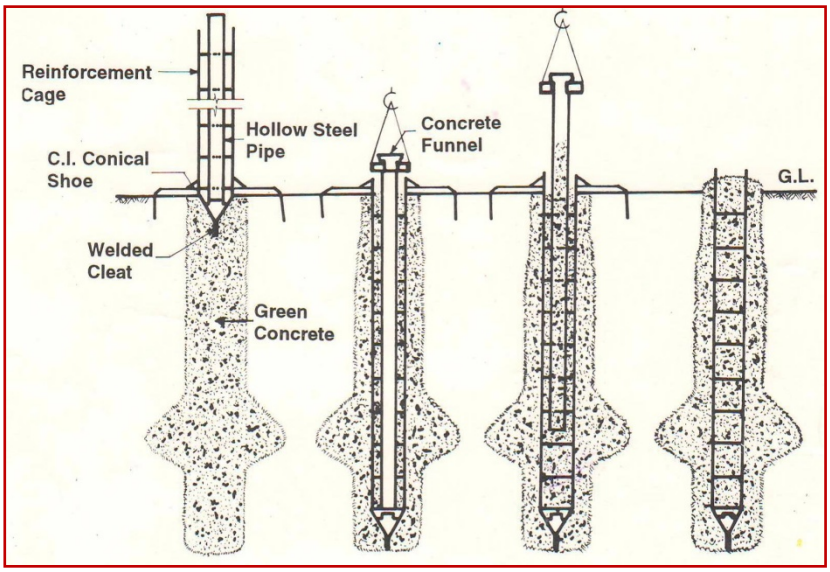
Bored Compaction Piles

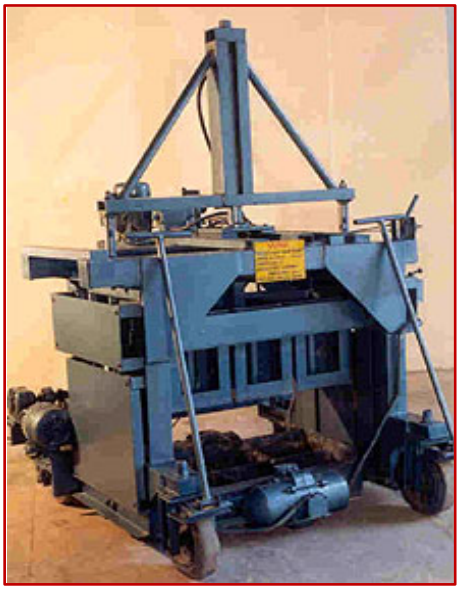


Applications	Used for foundation of structures of various types such as residential and industrial buildings, overhead tanks, towers, substations, gantry foundations, underground tanks, over bridges etc.
Salient Features	Combines the advantages of both bored and driven piles by compacting freshly laid concrete and soil around obtaining increased load carrying capacity over normal piles. Suitable for loose to medium silty/sandy soils specially with high water table.
Technology Package	Complete design and construction package
Techno-Economics	Initial cost of equipment is Rs.4 lakh
Scale of Development	Licenced, Technology is in production
Status of Commercialization	Commercialized
Raw Materials	Cement, aggregate and reinforcing steel
Plant, Equipment and Machinery required	Equipment for boring, augers, under reamer, steel pipes for concreting and driving, low weight driving equipment
Environmental Aspects	No adverse effect on the environment
IPR Status	Indian Patent No.126179

Semi-mechanized Brick Making Machine

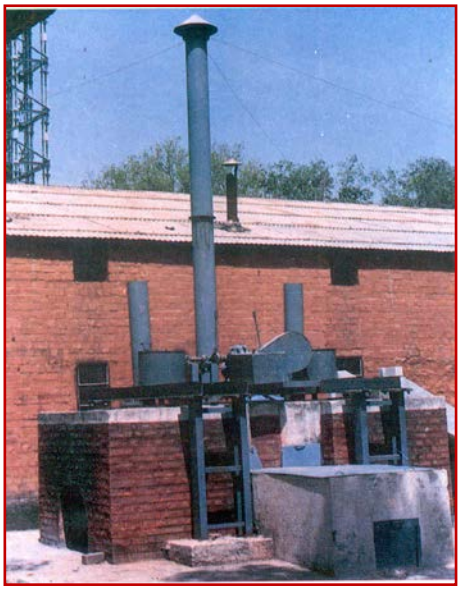
Applications	The machine is suitable for producing clay bricks using inferior soils based on extrusion process with de-airing facility followed by natural drying and burning in the kiln.
Salient Features	The machine produces uniform size and superior strength building bricks. Adoptable for other clay products. Easy operation and maintenance. The capacity of the machine is up to 2500 bricks (230x110x75 mm size) per hour.
Technology Package	Design drawings of the machine, specification of standard components and fabrication procedure.
Techno-Economics	Estimated capital investment is about Rs.100 lakh. A typical de-airing extrusion machine alongwith semi-automatic cutting table with a capacity of shaping 4000 bricks/hour will cost about Rs.8.5 lakh.
Scale of Development	Prototype fabricated and extensively tested.
Status of Commercialization	Commercialized
Raw Materials	Double-deck extruder with vacuum pump, semi-automatic cutting table, belt conveyor, motor and helical gear box and consumables.
Plant, Equipment and Machinery required	Standard mechanical workshop facilities including casting, machining and welding equipments.
Environmental Aspects	No adverse effect on the environment
IPR Status	Indian Patent No. 118570

Stationary Concrete Block Making Machine



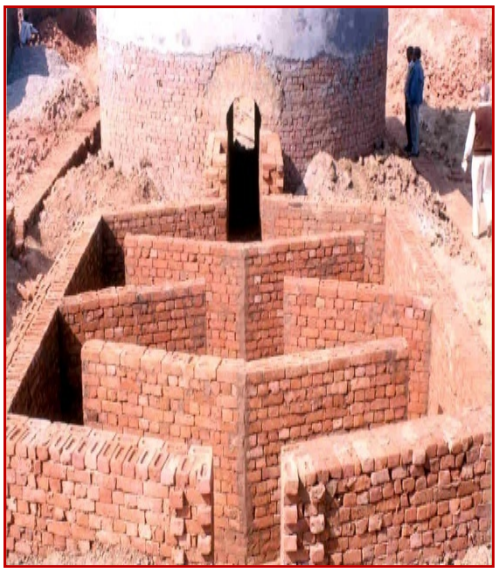
Applications	Suitable for on-site casting of solid and hollow concrete blocks
Salient Features	The machine is suitable for handling lean concrete mixes of low mobility for making economical concrete blocks using large aggregates of around 50 mm and ensures uniformity in dimensions and density. Casting capacity of machine is solid blocks of size 300x200x150 mm in one operation giving on output of 1000 blocks per 8 hours shift. The total power requirement is 3 kW. It is very useful whenever making of blocks at site is easy and cheaper such as in hilly areas where concrete block is a potential alternative to the first clay bricks. The machine is light in weight, compact and easily transportable from one location to another at site. While working it needs no anchorage with the ground.
Technology Package	Manufacturing drawings, specifications of standard components, assembling procedure and use.
Techno-Economics	Estimated capital investment is about Rs.10 lakh, cost of the block maker is approximately Rs.75,000/-
Scale of Development	Prototype designed and tested
Status of Commercialization	Commercialized
Raw Materials	Standard structural steel sections, shutter vibrators, Electric motors and Speed reducers
Plant, Equipment and Machinery required	Standard mechanical workshop facility
Environmental Aspects	No adverse effect on the environment
IPR Status	Indian Patent No. 232132

Energy Efficient Gypsum Calcinator



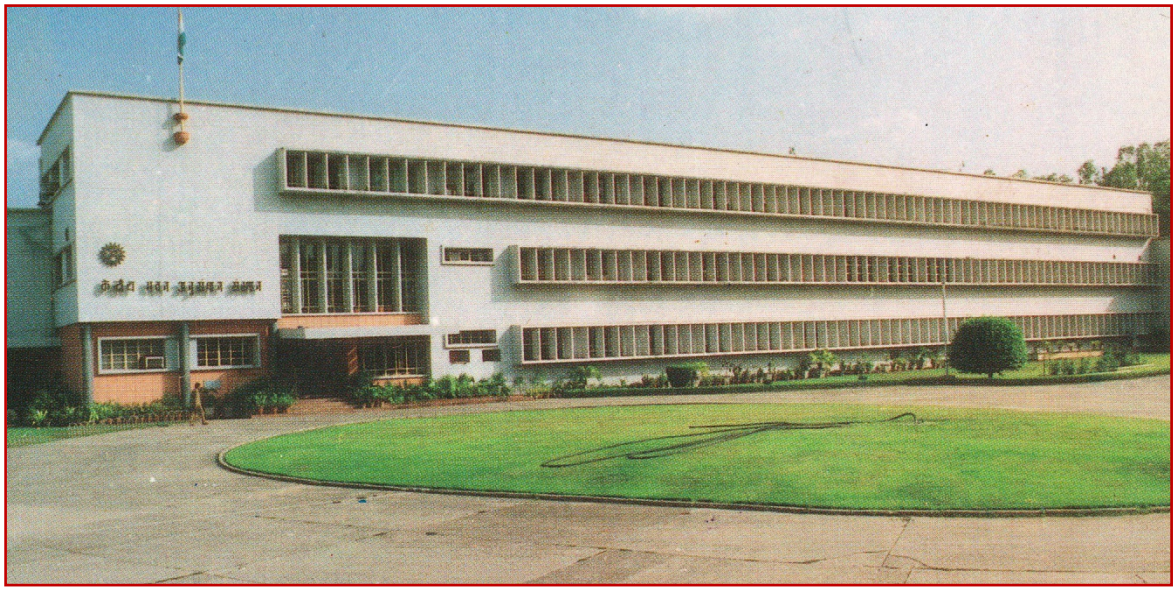
Applications	Calcination of quarry gypsum, marine gypsum, phospho-gypsum into plaster of Paris of various grades for use in building, pottery, ceramic and surgical applications.
Salient Features	The Calcinator comprises of a muffle furnace where in the charge is heated indirectly and agitated with a power stirrer. Temperature Control ensures uniform quality of end product. High Thermal efficiency 70-80%. Can be run on Coal/liquid fuels/gaseous fuels. Battery of basic modules, each of capacity 8 tpd (3 shifts) gives maximum calcinations capacity of 30 tpd (3 shifts) of plaster of Paris. Awarded by NRDC (1989) for meritorious features.
Technology Package	Production drawings of calcinator, fabrication procedure, specification of standard components, laboratory level training
Techno-Economics	Estimated investment for a battery limit plant of 8 tpd (3 shifts) is around Rs.10 lakh
Scale of Development	Commercial scale
Status of Commercialization	18 Licencees, Technology in production
Raw Materials	Natural quarry gypsum or marine gypsum or phosphogypsum, coal or liquid fuel or gaseous fuel chemicals (retarder/accelerator)
Plant, Equipment and Machinery required	Jaw crusher, Hammer mill, Calcinator, Air blower and Gas burner.
Environmental Aspects	No adverse effect on the environment
IPR Status	Not applied for Patent

Gravitational Settling Chamber for Pollution Control in Brick Kilns



Applications	Pollution control in Brick Kilns & other low stack furnaces/kiln.
Salient Features	The Government of India, through a gazette notification, has restricted the maximum permissible SPM concentration in the effluent gases to 750 mg/ and provision of a Gravitational Settling Chamber (GSC) has been made mandatory. A multiplied strategy was adopted to meet the following objectives without which the implementation of the developed device was not a possibility: 1. Sustainable development of the brick kiln industry. 2. Assumed continued employment for thousand of labours involved 3. Local intervention in the kiln. 4. No moving parts and no use of water and electricity. Taking the socio-economic parameters of the brick kiln owners into consideration we are able to evolve a simple and rugged design of GSC for pollution control in brick kiln.
Technology Package	Design drawings, process know-how, demonstration, assistance in construction.
Techno-Economics	Rs. 20,000 for construction of two settling chambers in one kiln
Scale of Development	Commercial scale
Status of Commercialization	Licensed, implemented in over 5000 brick kilns
Raw Materials	Bricks, cement & steel
Plant, Equipment and Machinery required	Civil Construction
Environmental Aspects	No special measures are required
IPR Status	Indian Patent No. 232333

Water Based Epoxy System for Concrete

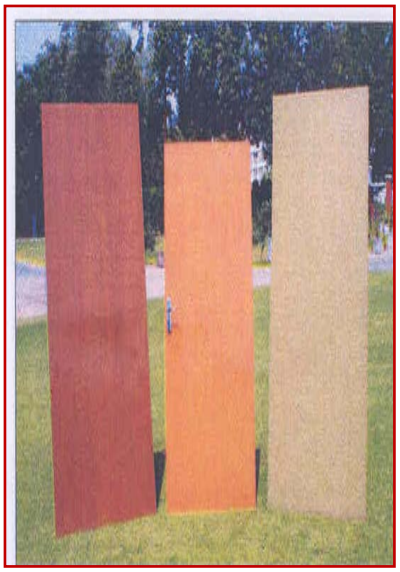


Applications	For the preparation of polymer modified mortars, polymer modified cementitious coating and bonding material for concrete.
Salient Features	The epoxy latex has been operated by emulsifying epoxy resin based on epichlorohydrine and bisphenol and its hardener in the presence of non-ionic surfactant (HLB value > 15). After emulsification, fillers, deforming and wetting agents were added. It was used for preparing polymer modified mortars, cementitious coating and bonding material for bonding old/new concrete. Formulations have been finalized on the basis of test results. Polymer modified mortar base on epoxy showed better performance as compared to those based on acrylic emulsion with respect to strength , water absorption and impermeability. Bond strength of the bonding agent based on epoxy latex is higher (L>1250 psi) than those based on acrylic and other emulsions (>450 psi). The developed bonding agent conforms to Type-II ASTMC : 1059, while others conform to only Type-I. It is therefore suitable for use in structure exposed to high humid conditions or immersed in water.
Technology Package	Process know-how document, demonstration , assistance in production
Techno-Economics	Investment of Rs. 80 lakh for a plant of capacity 100 ltrs per day
Scale of Development	Commercial scale
Status of Commercialization	Commercialized
Raw Materials	Epoxy resin base and hardener, surfactant, additives like defoaming and wetting agents
Plant, Equipment and Machinery required	Reaction kettle, stirrer, mixer and other lab equipment
Environmental Aspects	Normal measures adopted by the paint industry
IPR Status	Not applied for Patent

Roof Cooling Device

Applications	Provides a cool roof in buildings for thermal comfort of occupants. Saves electrical energy in air-conditioned buildings.
Salient Features	The device is meant for small individual houses. It eliminates heat radiation from hot ceiling and cools indoor air by a few degrees. It contains all components like pump, electronic controller, sensors etc in a single unit. It can be easily installed at site by local craftsmen. Provides thermal comfort by using less energy. Keeps inside cool even during short power cuts with inverter operated ceiling fans. Reduces power consumption of AC units by up to 30%. A 1/2 to 1 HP water pump works for a total of about 15 min in 24 hrs. Consumes less energy as compared to desert cooler, not adds humidity to indoor air. Highly environment friendly and cost effective. Reduces thermal stress on humans by reducing heat gain in a natural manner.
Technology Package	Know-how for commercial production of domestic unit.
Techno-Economics	Installation cost is Rs.300/sq.m. of roof area. Water consumption is 6 to 9 litres/sq.m./day.
Scale of Development	Commercial Scale
Status of Commercialization	Licenced
Raw Materials	Electric water pump, electronic components, sensors, steel hardware for chassis and housing, HDPE water tank, miscellaneous hardware
Plant, Equipment and Machinery required	A general mechanical workshop with steel cutting, bending, drilling and welding facility. Small printed circuit board electronic assembly unit.
Environmental Aspects	Does not use green house gases and not adds humidity to indoor air, Creates less humid healthy indoor living environment compared to desert coolers, Requires less energy than desert coolers, Highly environment friendly.
IPR Status	Not applied for Patent

Natural Fibre Composite Door/Panel



Applications	Door shutters, Panels, Laminates and Corrugated sheets.
Salient Features	The increasing demand for wood has created an alarming pressure on dwindling forests with adverse consequences on ecology. In view of this, a systematic R&D programme was initiated to develop wood substitutes utilizing natural fibres. The salient features of the developed products are: light weight, dimensionally stable, shape stability against operational load, adequate screw holding and nailing property similar to wood, carpenter friendly, durable against moisture, termite resistant and conforming IS: 2202.
Technology Package	Technical know-how produced on pilot plant scale, right to use patent. Product hand book and data sheet. Guidelines of setting of testing lab for Q.C. and other intellectual knowledge base related to project
Techno-Economics	The developed know-how includes : surface treatment of fibers, production of laminates and core materials and fabrication of products such composite door shutters, panels etc. It can be manufactured by using existing plants, equipments and machinery. The cost of developed panels and door shutters is comparable with wooden shutters.
Scale of Development	Pilot plant scale development
Status of Commercialization	Commercialized
Raw Materials	Natural fibers, resins, fillers and additives
Plant, Equipment and Machinery required	Hydraulic press, curing chamber, engineering moulds etc.
Environmental Aspects	To save deforestation caused by cutting of trees. ii) Utilization of local renewable resources (natural fibers).
IPR Status	Indian Patent No. 195175

Urethanized Bitumen System for Waterproofing Roof

Applications	Sealing, coating, adhesives and foam
Salient Features	Urethanized bitumen has been prepared with variable viscosity, adequate elastic resiliency and a reduced thermal susceptibility. These behaviour are confirmed by the thermal (DSC), rheological and IS: 1208-78. Its waterproofing functions is further assessed by IS: 1580 and IS: 1834-84 & ASTM D-3409-95 respectively. After assessing the materials suitability, compositional variables in products and parameters related to blend preparation are optimized. The urethane bituminous system has been prepared as per the requirement of end use applications.
Technology Package	Technical know-how produced on lab scale products with all details • Standardization of manufactured products • Preparation of product hand book/data sheet • Guidelines of setting of testing lab for Q.C. and documents • Intellectual knowledge base related to project and other users support strategy
Techno-Economics	Rs. 35/- kg.
Scale of Development	Lab level.
Status of Commercialization	Commercialized.
Raw Materials	Bitumen, polymer, stabilizer, adhesion promoter, filler etc.
Plant, Equipment and Machinery required	Blender & Mixers.
Environmental Aspects	No adverse affect on the Environment.
IPR Status	Not applied for Patent

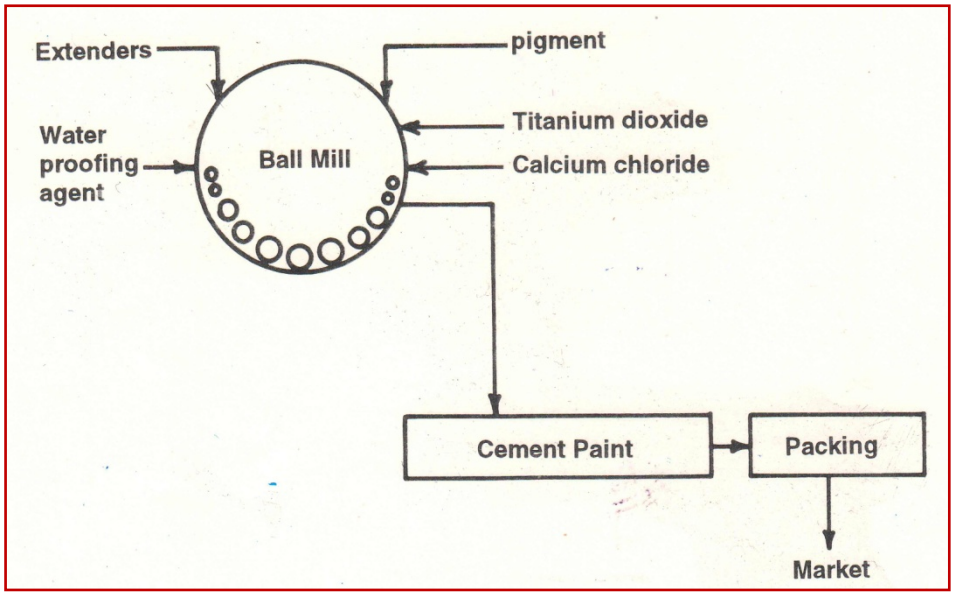
Cable Penetration Seal System (Cable Fire Stop)

Applications	To restrict the spread of fire through openings around the cables.
Salient Features	It is an assembly consisting of penetrating cables, penetration seal materials and devices, together with any supporting construction, designed to maintain the integrity and insulation performance of separating element for the duration of specified fire resistance rating. • Materials used are available indigenously. • Easy to install at locations with difficult approach such as under control panels. • Removable without damage to existing cable where space permits future extension to be made. • Having F and T rating of two hours • Resist relevant external influences to the same degree as the wiring system with which it is used.
Technology Package	Know-how, formulation, mixing technique and installation
Techno-Economics	Viable
Scale of Development	Commercial Scale
Status of Commercialization	Commercialized
Raw Materials	Indigenously available fire extinguishing foam concentrates (3% or 6%) and Water
Plant, Equipment and Machinery required	Equipments required mainly for mixing and pouring of compound
Environmental Aspects	Eco-friendly- No adverse effects on the environment
IPR Status	Not applied for Patent

Silicate Based Waterproofing Formulation

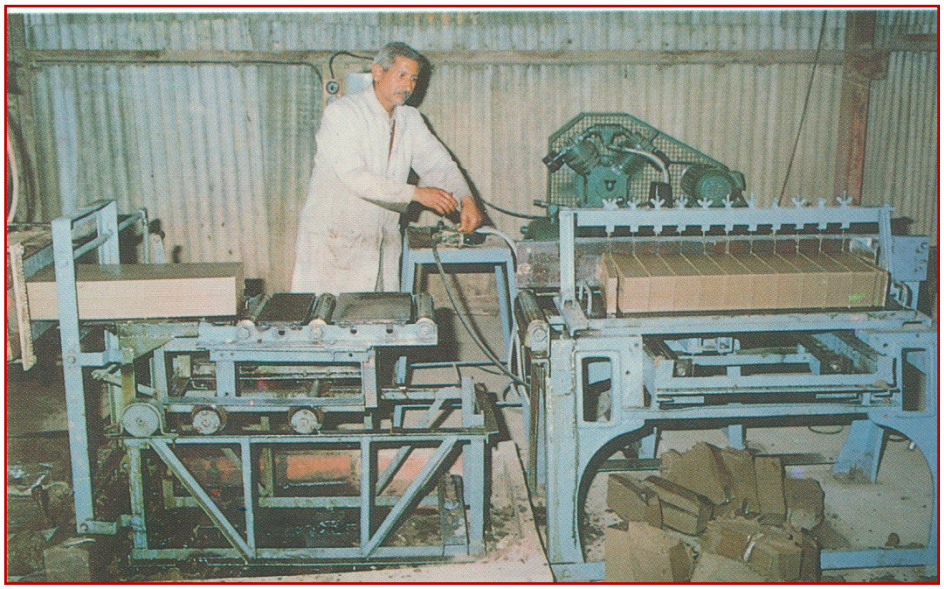
Applications	Water proofing in building industry.
Salient Features	Does not interfere with colour of the surface, long shelf life if kept sealed, dilutable with potable water, can be applied by semi-skilled labour, life of treatment is about 5 years.
Technology Package	Process know-how containing method of preparation, plant and equipment, raw materials required.
Techno-Economics	Investment of Rs. 7 lakh for a plant of capacity 400 liters per day.
Scale of Development	Commercial scale.
Status of Commercialization	Licensed, Technology in production.
Raw Materials	Commercial variety of sodium silicate, distilled water and other chemicals.
Plant, Equipment and Machinery required	Mixer with impeller, distillation plant, air-tight drums and laboratory equipment.
Environmental Aspects	No special measures are required.
IPR Status	Not applied for Patent

Cement Paint



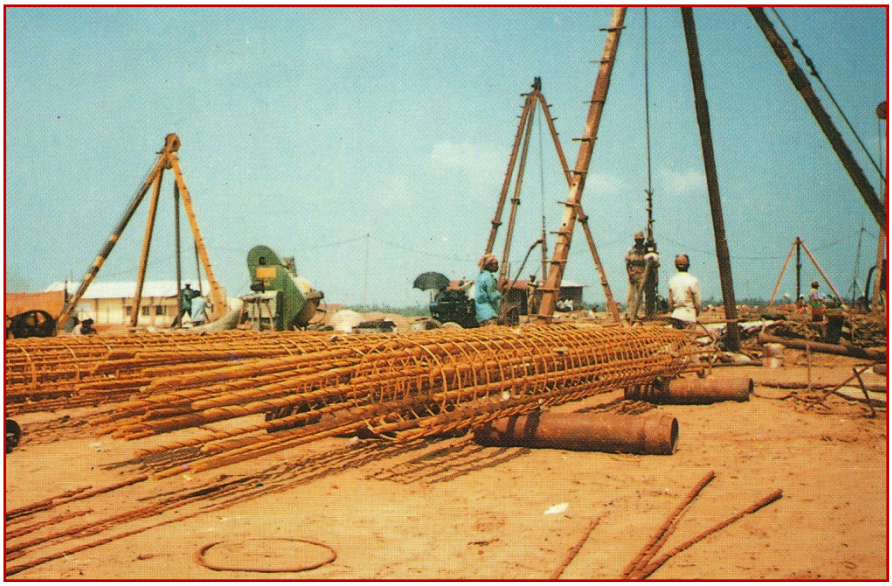
Applications	Exterior coating for cement concrete, cement plastered wall, AC sheets, brick work etc. for decorative as well as water resistant purposes.
Salient Features	It has good covering capacity, high water repellency, easy mixing, and better resistance to crazing, map cracking and microbial growth.
Technology Package	Specifications of raw materials, plant & machinery and cost economics.
Techno-Economics	A plant of 2 tpd (one shift) capacity requires an investment of Rs. 22 lakh.
Scale of Development	Laboratory and field trials conducted.
Status of Commercialization	Licensed, Technology in production.
Raw Materials	White cement, pigments, accelerators, water-repellants, hydrated lime, etc.
Plant, Equipment and Machinery required	Ball mill
Environmental Aspects	No special measures are required
IPR Status	Not applied for Patent

Plant for Shaping Building Bricks from Inferior Soils/Industrial Waste by Extrusion Process



Applications	For Shaping building bricks and other structural clay products
Salient Features	Plant comprises a heavy duty brick extrusion m/c and Semi-automatic cutting table having capacity of 4000 bricks/hr. Extrusion m/c is of double deck design having independent clutches. Effective de-airing system facilitates shaping of good quality bricks from alluvial/inferior soils and industrial waste. Semi-Automatic cutting table, pneumatically operated is suitable for cutting clay column into bricks with the help of movable battery of wires at the rate of 10 bricks per stroke. Total power requirement-105 H.P.
Technology Package	List of standard components with specification, List of spare parts to be supplied with the plant, Complete fabrication drawings.
Techno-Economics	Cost of a semi-automatic cutting table would be approximately Rs.7000/-.
Scale of Development	Commercial scale
Status of Commercialization	Prototype
Raw Materials	Standard steel sections, Air compressor unit and Pneumatic cylinder.
Plant, Equipment and Machinery required	Standard mechanical workshop facilities including foundry, machining and welding equipment.
Environmental Aspects	No special measures are required
IPR Status	Indian Patent No.132445

Epoxy-phenolic IPNet-RB Coating for Steel Reinforcement in RCC



Applications	Corrosion protection of steel reinforcement.
Salient Features	Resistant to chemicals, excellent adhesion to steel reinforcement, excellent bond of coated bars with concrete, durable and easy application and cost effective.
Technology Package	Process know-how document, demonstration, assistance in production.
Techno-Economics	Investment of Rs.40 to Rs.50 lakh for a plant of capacity 100 liters per day.
Scale of Development	Lab Scale
Status of Commercialization	Licensed, Technology in production.
Raw Materials	Epoxy resin base and hardner, prepolymer of cardanol and other additives.
Plant, Equipment and Machinery required	Blender, Mixer, Reaction Kettle, Sieving and laboratory equipment.
Environmental Aspects	Normal measures adopted by the paint industry.
IPR Status	Not applied for Patent

High Strength Plaster from Fluorogypsum

Applications	Suitable for use in plastering – Finish coat & Base coat
Salient Features	The high strength plaster is developed by benefication and fine grinding of fluorogypsum and admixing it with suitable chemical activators. Plaster showed high compressive strength (30-35 MPa) and low water absorption (< 8 %) and porosity (<10 %) and complied with requirement as given in ASTM C-61-50. The technology for formulation of high strength plaster is simple and no heavy machinery is involved. The plaster is fire resistant, possess good acoustic properties, self strengthening with time and helps in conservation of cement.
Technology Package	Process know-how & demonstration.
Techno-Economics	For a plant of capacity 1000 tonnes per day (3 shifts), the cost of high strength plaster comes out Rs. 2200/- per tonne.
Scale of Development	Developed on laboratory scale.
Status of Commercialization	Licenced
Raw Materials	Fluoro-gypsum
Plant, Equipment and Machinery required	Ball mill / Vertical Roller mill
Environmental Aspects	No special measures are required
IPR Status	Not applied for Patent

Direct Foam Injection (DFI) technology for the Petroleum Oil Tank Fire Safety

Applications	For fire protection of Class B Flammable Liquid Storage Tank Fires in Petroleum refineries, Oil storage depots & Terminals, Chemical, Petro-chemical & allied industries.
Salient Features	Efficient and Effective Fire Extinguishment (Extinguishment Time < 60 s), Minimum Foam Induction/Application Rate of 3 litres//min., In-built System Fire Resistance rating of ½ hr to 1 hr against any eventual fire exposure damage, due to severe heat, Suitable for protection of all non-polar flammable liquids, even with boiling point higher than 100 degree. C, Uniform, gentle and effective foam delivery onto the flammable liquid surface without partial disintegration of the foam bubbles and the fuel pick-up, less vulnerable to serious damage in the event of explosion and, or buckling of tank plates by virtue of its inherent design features, Technically simple and economic application method, large scale oil storage tank fires can be effectively tackled by the low-cost foam compounds available in the market., No need to hold high cost foam compound inventory.
Technology Package	Details on Major Plant Equipment and Machinery required
Techno-Economics	Approx. Rs. 5000/- ± Rs. 1000/- per of Area of Petroleum Oil tank-fire protection.
Scale of Development	Lab Scale
Status of Commercialization	Ready for Commercialization
Raw Materials	Fire extinguishing foam concentrates(3% or 6%) and Water
Plant, Equipment and Machinery required	Vapour-sealing Fire Extinguishing Foam-Discharge Nozzles, Annular-pipe rings, Cross-member piping work, Co-flexi –Pipe for Floating Roof tanks, Foam generators, Fire resistant Vertical Risers, High capacity High pressure Pumping Unit, Water Storage, foam concentrate storage etc. Valves, gauges, and other related accessories.
Environmental Aspects	Eco-friendly
IPR Status	Indian Patent No. 177234, US Patent No.5573068

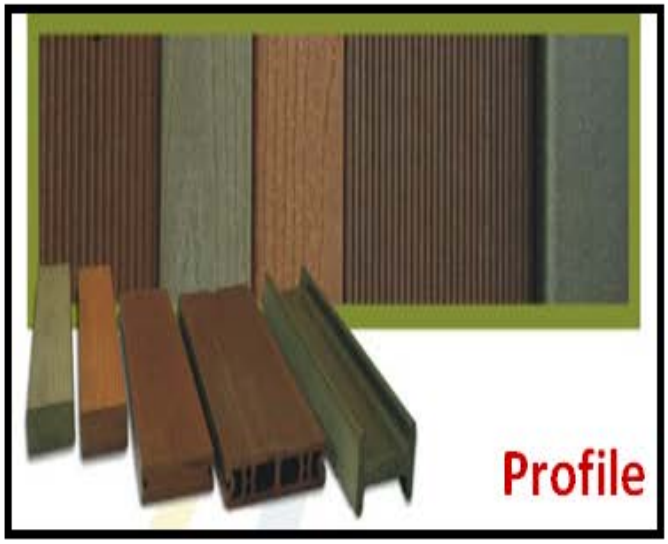
Liquid Extinguishant Fire Extinguisher

Applications	Suitable to combat the following fires with the following key uses/application areas : Class A all-type Combustible material Fires" such as paper, wood, cloth, etc; Class B Flammable Liquid Fires" such as petrol, diesel, kerosene; Class K Kitchen-Pan Fires for women's fire safety" and the "Electrical fires" due to short-circuits.
Salient Features	Fire Suppression Time: 8-10s on 100 Size Class A & B Fires and 25-30 on 1000 Fire, Extinguishant App. Rate: 3-5 g/s for different Classes of fires.
Technology Package	Novel Fire extinguishing composition/ formulation, Mixing ratio, Work-out Procedure, The details of specifications of spray bottles, Unique selling points/parameters/ novelty features, Key application areas and specifications of its operation/use.
Techno-Economics	Less than one lakh for budding entrepreneur, approx. Rs. 20 to 25 Lakhs for budding entrepreneur to SSI unit depending upon the capacity of the plant., For large-scale plants, a separate techno-economic feasibility study is required in consultation with field & financial experts.
Scale of Development	Laboratory-scale development to extinguish 1000 size of fires.
Status of Commercialization	Licensed
Raw Materials	Novel Fire extinguishing composition & water
Plant, Equipment and Machinery required	Plastic or SS304 Mixing Containers with mixing device @ 30-40RPM at ambient temp. & pressure, storage containers; Spray-bottles can be procured either from the market and/or the Bottling and manufacturing plant for Spray-bottles may be set-up either for Plastic or SS202/304 bottles with conveyer-belt facility.
Environmental Aspects	No adverse effects on the environment
IPR Status	Not applied for Patent

Pine Needle Composite Board/Panel

Applications	Boards, Panels, door panel insert and furniture items
Salient Features	A systematic study was undertaken on the rational utilization of pine needles as an alternative to wood for making building boards and panels. It belongs to medium and high density board categories, dimensionally stable, sufficient internal bond strength, easily cut and sawn, good sound and thermal insulation, fire resistant, resistance to fungus and termite adequate screw holding and nailing property, durable against moisture, termite resistant and conforming IS: 3087.
Technology Package	Technical know-how produced on lab scale, right to use patent. Product hand book/ data sheet. Guidelines of setting of testing lab for Q.C. and other intellectual knowledge base related to project
Techno-Economics	It can be manufactured by using existing plants, equipments and machinery. The cost of developed panels is comparable with the commercially available ligno-cellulosic panel products.
Scale of Development	Lab scale development
Status of Commercialization	Ready for commercialization
Raw Materials	Pine needles, resins, adhesives and additives
Plant, Equipment and Machinery required	Shredder and hammer mill, rotary drum mixer, hydraulic press, cutting and finishing devices.
Environmental Aspects	• To save natural resources such as wood. • To prevent health hazard caused by formaldehyde.
IPR Status	Indian Patent Application No. 0531/DEL/2010

Rice Husk Plastic Composite (Wood without tree)



Applications	Window & door frames, profile panels, decking, fencing, flooring, park benches etc.
Salient Features	Wood like surface appearance, dimensionally stable, biologically durable, easily recyclable, carpenter friendly, replacement of natural wood, meets requirement of NBC 2005, Sec 3, Timber.
Technology Package	Technical know-how produced on lab scale, right to use patent. Product hand book/ data sheet. Guidelines of setting of testing lab for Q.C. and other intellectual knowledge base related to project
Techno-Economics	Process know-how includes: rice husk flour production line, compounding line and profile extrusion line. The cost of developed products is comparable with the teak wood and alike.
Scale of Development	Pilot plant scale development
Status of Commercialization	Commercialized
Raw Materials	Rice husk, thermoplastic resins and additives
Plant, Equipment and Machinery required	Digester, k mixer/ k neader, extruder, engineering moulds and other ancillary items.
Environmental Aspects	To save deforestation and environmental aspects caused by cutting of trees, and Plastic wastes are being utilized in the process.
IPR Status	Indian Patent Application No. 2193/DEL/2008

Modified Epoxy Cardanol IPN Protective System for Concrete & Steel Structures

Applications	Corrosion Protection
Salient Features	The system is based on the synthesis of epoxy cardanol under vacuum. Cardanol is a phenol obtained from fractional distillation of CNSL resin. The condensation of epoxy resin with cardanol is carried out in a reaction kettle at elevated temperature under inert atmosphere. The output is checked for alkalinity and then discharged from the vessel and collected at room temperature.
Technology Package	Technology document
Techno-Economics	Investment of Rs.70 to 80 lakh for a plant of capacity 100 liters per day
Scale of Development	Lab scale
Status of Commercialization	Licenced, Technology in production
Raw Materials	Epoxy resin and hardener, cardanol and additives
Plant, Equipment and Machinery required	Reaction kettle, Mixer, Blender and other laboratory equipment.
Environmental Aspects	No specific emission study done, Paint industry norms are to be followed.
IPR Status	Not applied for Patent

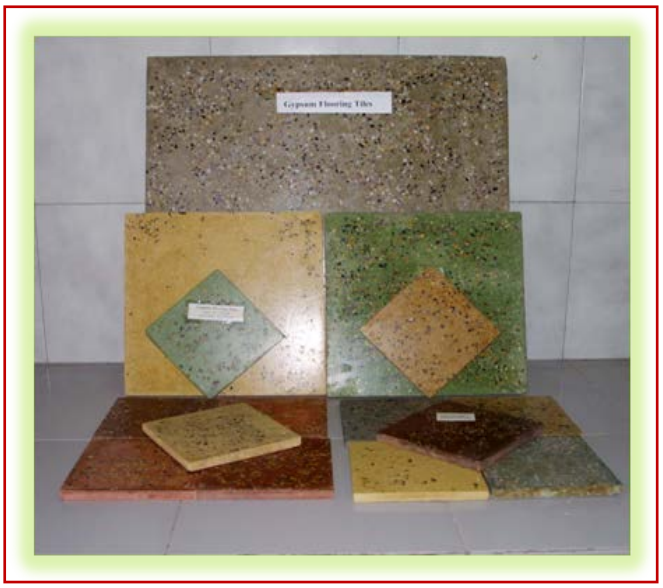
Cement Based Vermiculite Tiles

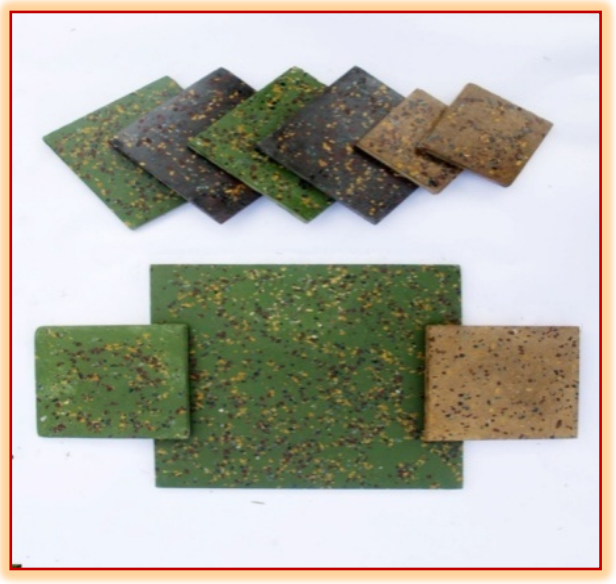
Applications	Suitable for thermal insulation in Residential, Commercial & Industrial Buildings
Salient Features	Maximum heat transmission takes place through the exposed surface of the roof (more than 60%). Use of the thermally insulated material provide thermal comfort inside the room on one end and reduce the energy requirement for cooling in summer and heating in winter. Therefore, keeping this in view, we have developed cement based vermiculite tiles using water dispersible polymers along with additives. To get the improved physio-mechanical properties, high pressure compaction technique has been used. These tiles are light weight. All the parameters such as polymer ratio, conditions etc. have been optimized. These tiles can provide thermal insulation to the computer rooms, cold storages etc. as the material arrest the heat dissipation.
Technology Package	Process know-how document, demonstration of the process
Techno-Economics	Approx. 1000 sq, meter (profitability : 20 - 22%)
Scale of Development	Lab Scale
Status of Commercialization	Licenced, Product is commercially available
Raw Materials	Cement, Water dispersible polymers, Different grades of vermiculite, compatible additives
Plant, Equipment and Machinery required	Hydraulic Press, Vibration Table, Mixer and Moulds etc.
Environmental Aspects	Eco-friendly
IPR Status	Not applied for Patent

Fire Resistant Metallic Door

Applications	Uninterrupted spread of fire in buildings is one of the major issues responsible in increasing the quantum of direct and indirect fire losses. Door openings, by necessity breach compartment walls allowing failure of integrity and insulation causing fire to spread uninterrupted. It is therefore essential to restrict spread of fire to achieve the required degree of containment. Failure to do so may cause considerable loss of life and property. A fire door with a specific -resistance rating is used as part of a fire protection system to reduce the spread of from one to other and to enable safe egress from a occupancy
Salient Features	Meets all the three criteria i.e. stability, integrity and thermal insulation of fire resistance rating as per BS 476 Pt. 20 & 22, IS 3614 Pt 2, Low thickness, No intumescent strip used, Material used is indigenously available, Mainly used in all types of occupancies for the confinement of fire.
Technology Package	A set of design drawing and process know-how
Techno-Economics	Viable
Scale of Development	Commercial Scale
Status of Commercialization	Licenced
Raw Materials	Indigenously available
Plant, Equipment and Machinery required	Required mainly for sheet metal work i.e. shear, bending and punching.
Environmental Aspects	No adverse effects on the environment
IPR Status	Not applied for Patent

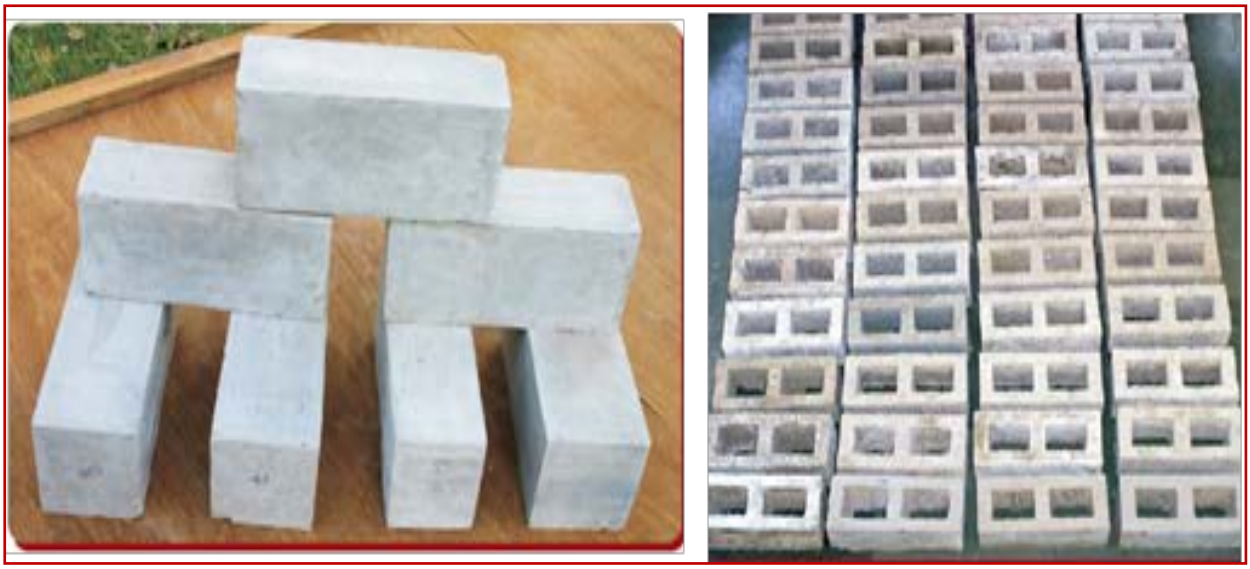
Flooring Tiles from Waste Gypsum





Applications	Suitable for use in flooring and general purpose as a replacement to ceramic and cement tiles.
Salient Features	Tiles are cast by vibration moulding of moist mixture containing gypsum anhydrite plaster/fluoro-gypsum, pigments, polymers, fibres etc. Tiles are of high strength, low water absorption and wear resistance and complied with the requirement of IS: 1237-2012.
Technology Package	Process know-how & demonstration.
Techno-Economics	Investment for a plant for producing 40 sq.m tiles per day in 3 shifts is ~Rs.30.0 lakhs. The production cost of one tile (Size 300 x 300 x 20 mm) comes to Rs.25/- per sq. ft.
Scale of Development	Developed on laboratory scale. Pilot plant of capacity 40 sq. m per day may be set up with help of industry.
Status of Commercialization	Licenced
Raw Materials	Fluoro-gypsum/ Phospho-gypsum
Plant, Equipment and Machinery required	Vibrating table, moulds, mixers, curing chamber, drying chamber, rotatory kiln, ball mill, grinding and polishing machine and demoulding plates.
Environmental Aspects	No special measures are required
IPR Status	Indian Patent No.226284

Geopolymeric Building Materials



Applications	Bricks, blocks, concrete, reinforced concrete, light weight concrete etc.
Salient Features	The salient features of developed product are: high early compressive strength, low water absorption, low shrinkage, durable against aggressive environments, fire resistant etc.
Technology Package	Technical know-how produced on lab scale, right to use patent. Product hand book/ data sheet. Guidelines of setting of testing lab for Q.C. and other intellectual knowledge base related to project
Techno-Economics	Process know-how includes: inter-grinding of ingredients, gradation of aggregates, preparation of activators, mixing, casting and curing. It can be manufactured with the help of existing plants and machinery. The cost of developed products is comparable with the conventional materials.
Scale of Development	Lab scale development
Status of Commercialization	Ready for commercialization
Raw Materials	Fly ash, alkaline activators, aggregates and admixtures
Plant, Equipment and Machinery required	Pan mixer, moulding machine, engineering moulds, curing chamber etc.
Environmental Aspects	To save natural resources, Utilization of waste materials and Low emission as compared to cement.
IPR Status	Indian Patent Application No. 3368/DEL/2014

C- Brick Machine

Applications	Production of bricks utilizing flyash and other siliceous and calcareous wastes
Salient Features	This machine has been developed on vibro-compaction principle to produce about 3,000 bricks per shift. Mould box of the machine having four cavities of brick dimensions is placed on a wooden pallet. The pallet in turn is placed on the table of the machine. All the cavities of the mould box are filled up with a prepared wet mix of raw materials. Four plungers which swivel through 360 degrees are now shifted over the mould box and lowered down over to rest over the filled up cavities. The moulds are vibrated for about 5 seconds. Mould box is raised by operating a hand-operated lever so that the plungers remain over the shaped bricks. The plungers are raised by operating second lever, which leaves four well-shaped bricks on the pallet. The pallet is now removed manually and placed in the sun for drying prior to steam/wet curing. The machine produces bricks of size 230 x 110 x 75 mm with frog on it with excellent quality and good dimensional stability. This machine is simple in operation.
Technology Package	Manufacturing drawings of C-BRICK Machine, specification of standard components.
Techno-Economics	Capital investment : Rs. 3,00,000; Man-power: 10; Land : 700 sq-m; installed power : 10kW; Estimated production cost : Re. 1.00 per brick
Scale of Development	Commercial scale
Status of Commercialization	Licensed
Raw Materials	Standard steel sections
Plant, Equipment and Machinery required	Welding/fabrication facilities
Environmental Aspects	Pollution free, helps in pollution abatement
IPR Status	Indian Patent No. 231647