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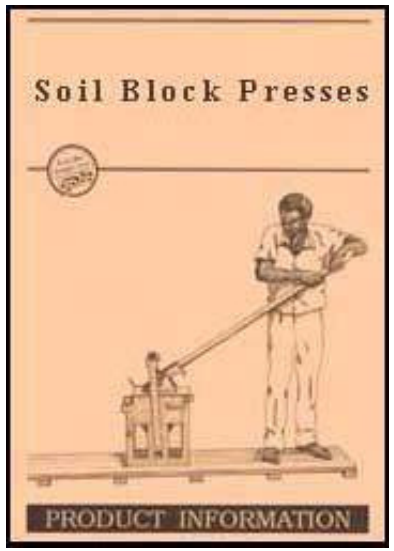

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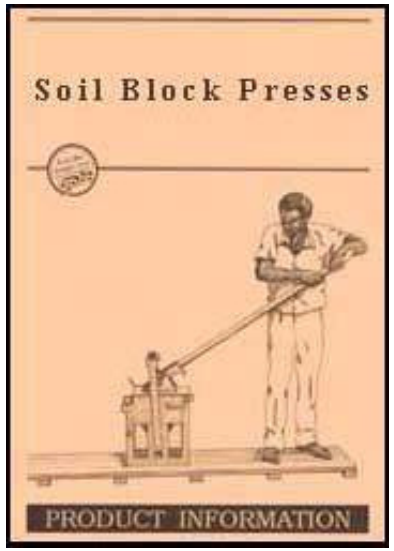

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A Publication of the Deutsches Zentrum fr Entwicklungstechnologien - GATE, a Division of the Deutsche Gesellschaft fr Technische Zusammenarbeit (GTZ) GmbH - 1988

NOTE 1: The technical details were provided by the producers. GATE is not in a position to verify these data and therefore cannot accept responsability for any inaccuracies. In cases where prices have been quoted, these are subject to change and are thus meant to serve only as guidelines valid for 1988.

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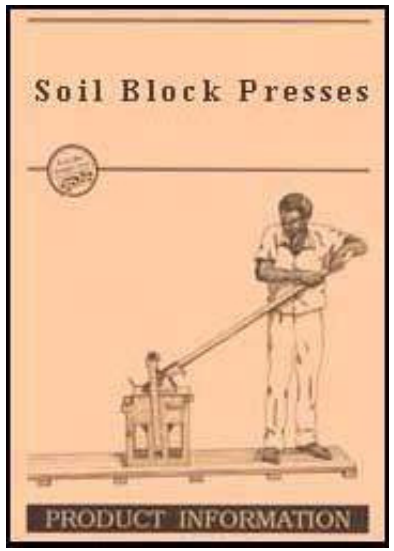

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Bibliography

Multibloc BREPAK block press

Manufacturer
Multibloc Limited
Blackswarth Road
Bristol BS5 8AX
England
Tel. (0272) 55 19 51
Tlx. 44 716 mobile g
Fax. (0272) 55 08 62

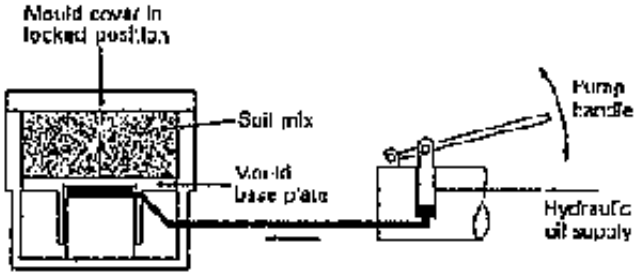
Description

The BREPAK block press was developed in 1980 by D.J.T. Webb at the Building Research Establishment at Watford, England. The aim was to produce stabilized soil blocks of good appearance with a compaction pressure around 10 N/mm², for increased strength and durability, facilitating wall constructions without external rendering, despite low quantities of stabilizer.

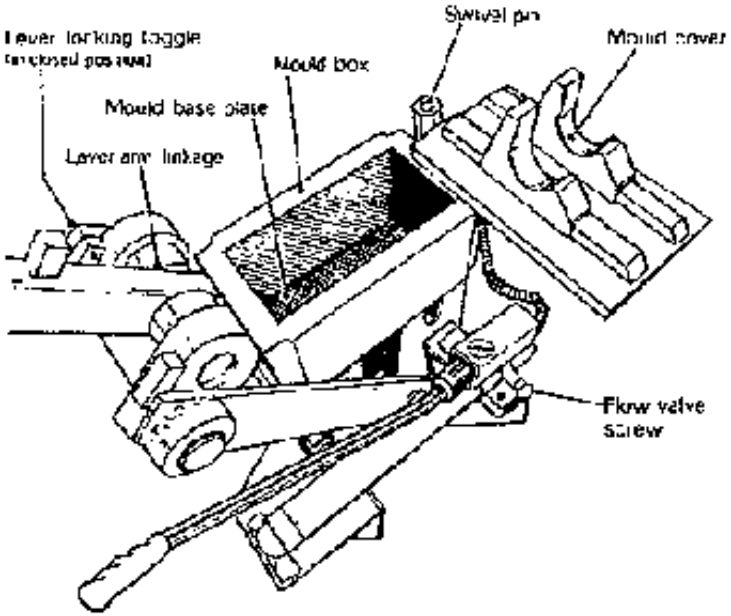
Designed on the principles of the CINVA-Ram, the Multibloc BREPAK machine is an all-steel construction, comprising a fixed mould and supporting structural frame. It is fitted with a lever arm extension and mechanical linkage which provides a means of locking the moveable top cover plate onto the mould, and also allows for initial compaction of the soil mix within the mould. The desired compaction pressure - 5 times that of the CINVA-Ram - is achieved by means of a hand

operated hydraulic pump, acting through a piston beneath the base plate of the mould.

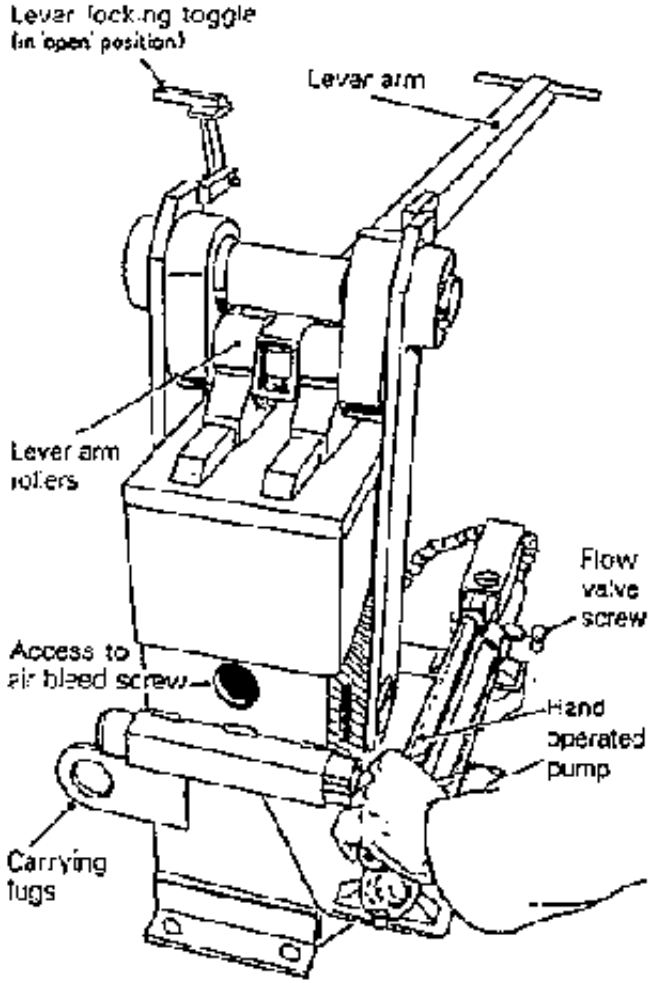
The complete unit is mounted on a firm base, ideally one made of steel sections, or a strong timber baseboard (neither of these are supplied with the machine, because of their weight and high transport costs). For transport from site to site, the press can easily be lifted by four people, using two strong bars held by four projecting brackets, two on either side of the machine.



FIGURE


Lever locking toggle
Swivel pin
Mould box
Mould base plate
Lever arm linkage
Flow valve screw

FIGURE



FIGURE

Operating the BREPAK Machine

FIGURE (1;2;3)

1. With the lever arm in the start position, (at about 45°), the flow valve screw on the hand pump is opened (one complete turn anticlockwise), the internal faces of the mould box oiled and the measured amount of soil mix placed in the mould cavity.

2. The mould cover is swung back to close the top of the mould box, removing the surplus soil and the lever arm is raised to the vertical position, when the lever locking toggle is released.

3. The soil is precompacted by continuing the movement of the lever arm down to the horizontal position, the flow valve screw is then turned clockwise until it is hand tight and the hydraulic hand pump operated about 40 full strokes until the pressure relief valve opens with an audible signal, and the handle becomes slack.

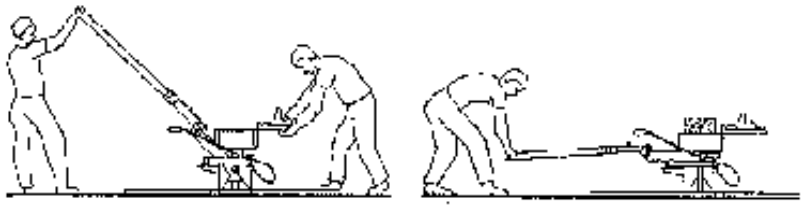


FIGURE (4;5)

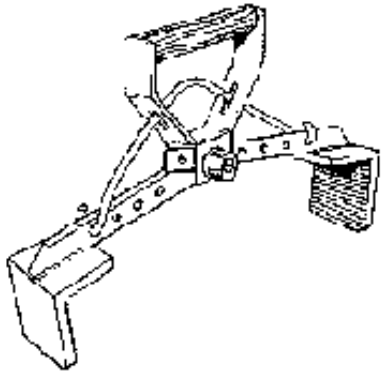
4. With one full turn of the flow valve screw anticlockwise, the lever arm is swung back to its start position, with the lever locking toggle closed again, and the mould cover rotated sideways to expose the pressed soil block.

5. By pulling the lever arm further downwards and overcoming the resistance by slight jerks the mould base plate is pushed upwards until the pressed block is

completely clear of the mould and can be lifted off and taken away for curing.

The BREPAK Block Clamp Lifter

This device is used to carry the blocks (each weighing about 9 kg) in just one hand, and place them accurately in masonry construction, producing perfectly uniform joints.



FIGURE

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Kenya, 1985

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7. Webb, D.J.T.; Lockwood, A.J.: BREPAK Operators Manual, Building Research Establishment Client Report, Copy supplied with BREPAK Machine, 1987

Technical Details

Size of machine (length x width x height)	63 x 44 x 71 cm (25 x 17 x 28 in)
With lever arm extension: total height	229 cm (7 ft 6 in)
Weight of machine (including lever arm)	163 kg
Size of crate for shipment	77 x 57 x 138 cm (30 x 22 x 54 in)
Weight of packed machine	231 kg
Standard block size	29 x 14 x 10 cm (11.4 x 5.5 x 4 in)
Effective thrust on mould base plate	44 tonnes
Effective compaction pressure	10 N/mm²(1450 p.s.i.)

Compression ratio	1.55:1
Energy input/transmission	manual/hydraulic
No. of blocks per cycle/output rate	1 /30 - 40 blocks per hour
Labour force required (incl. excavation and mixing)	6 men

Price (ex works)	BREPAK	1217 £ Sterling (approx. 2140 US$)
valid until	Seal kit for hydraulic pump	21.56 £ Sterling (approx. 38 US$)
January 1988	Block clamp	20 £ Sterling (approx. 35 US$)

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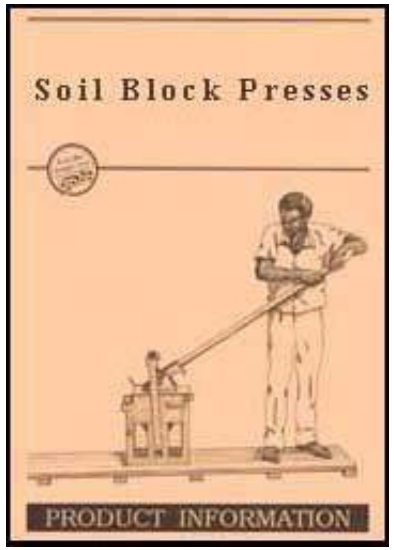

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TEK- Block Press

Manual presses produced in Africa 1

Manufacturer
Mechanical Engineering Dept.
Faculty of Engineering
University of Science and Technology
Kumasi
Ghana
Tel. 43 61, 53 51
Cables: Housing Kumasitech

Description

The TEK-Block Press was developed in 1970 by the Department of Housing and Planning Research, Faculty of Architecture, U.S.T. Kumasi, with the aim of modifying the CINVA-Ram to suit the local requirements. While the main components of the TEK-Block Press, with its mould box, moveable cover, lever and piston, are principally the same as those of the CINVA-Ram, some of the details are different.

One important difference is that the lever is connected to the mould cover, which moves back with the lever arm and connecting links, when opening the mould and ejecting the block. This reduces the number of manual operations and provides unobstructed access to the mould.

An automatic locking device is fitted to the connecting link and the handle socket.

This

locks the handle to the side links, so that they move as a unit when ejecting the pressed blocks. The blocks are demoulded by pivoting the locked assembly on the rear pulleys. This device eliminates the need to manipulate a locking device during the blockmaking cycle.

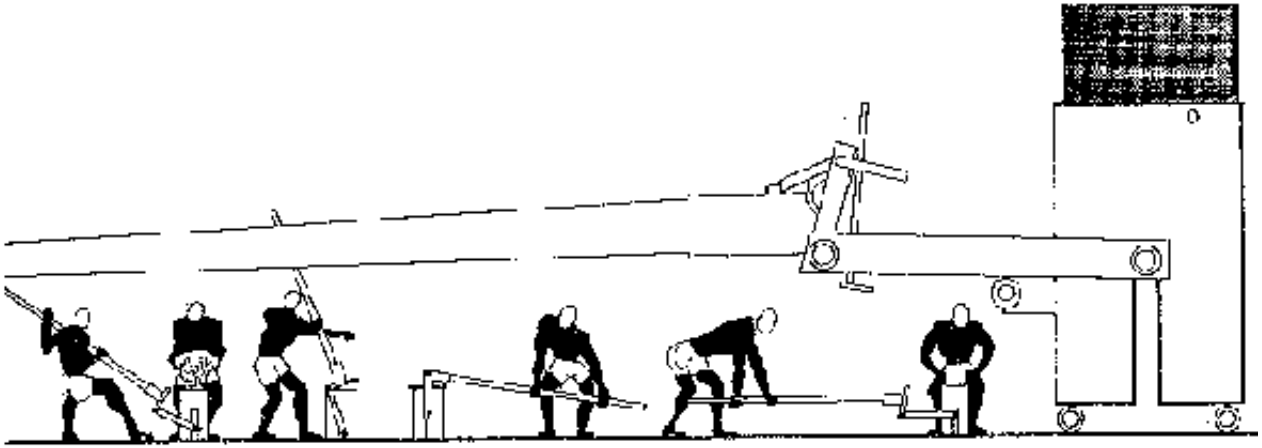
Instead of the three-piece metal arm used for the CINVA-Ram, the lever arm is a wooden handle inserted in the metal socket. In order to save the costs and effort of transportation, the handle and wooden rails, onto which the machine has to be mounted for stability, are not supplied with the machine, as these are usually available locally. Another reason for using a wooden handle is that it will break before jamming the piston, in case of overfilling the mould.

Operating the TEK-Block Press

The connection of the mould cover to the lever arm and the automatic locking device serve to reduce the number of manual operations to an absolute minimum.

Pulling back the lever arm moves the piston into the filling position and opens the mould in one operation. When the mould is filled, the lever arm is swung over the mould and down to about the horizontal position on the other side, closing the mould and compressing the block in the process.

The same operation in the reverse direction opens the mould and ejects the block. The simplicity of these operations makes the machine especially suited for unskilled labour, although some care is needed to ensure proper filling of the mould.



FIGURE

Technical Details

Size of machine (length x width x height)	32 x 23 x 79 cm (13 x 9 x 31 in)
Weight of machine	85 kg
Size of crate for shipment	58 x 50 x 90 cm (23 x 20 x 36 in)
Weight of packed machine	approx. 110 kg
Standard block size (single mould)	29 x 21.5 x 14 cm (11.4 x 8.5 x 5.5 in)
Nominal compaction force	6- 12 tonnes
Nominal compaction pressure	1.05 - 2.1.N/mm² (150 - 300 p.s.i.)
Compression ratio	1.6:1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate	1 /50 blocks per hour
Labour force required (incl. excavation and	10 men

mixing)		

Price (ex works)	TEK-Block Press	30000 ¢ (approx. 173 US$)
valid January 1988		
¢ = Cedi		(Note: The machine has so far not been produced for export. The price serves only as a guideline, as the exchange rate is determined weekly.)

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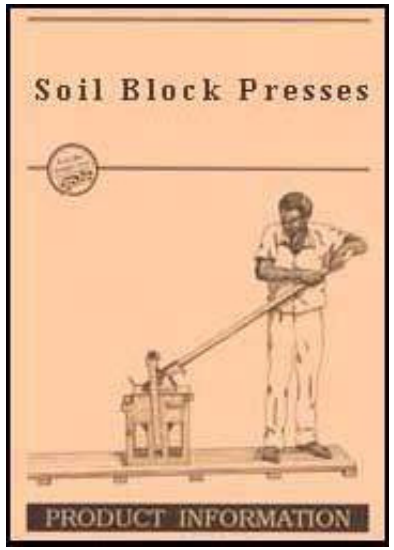

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Vs CINVA ram

Manual Block Presses Produced in Africa 2

Manufacturer
Sohanpal Metal Works Ltd.
P.O. Box 904
Tanga
Tanzania
Tel. 411 58, 28 93

Description

The VS Cinva Ram, which was developed by Thomas Kuby, GATE, is a modified version of the famous Latin American machine, it was named after. The modifications were developed on the basis of observations of local working conditions in Tanzania and problems encountered with other blockmaking machines. The main design objectives of the VS Cinva Ram were high resistance to rough use, prevention of overloading and simplification of manual operations.

The all-steel block press is designed to incorporate components that can be made in local workshops equipped with flame cutter, arc welder, metal saw, drill and lathe. Repairs can thus be carried out in any local metal workshop.

Some interesting details are, for instance, the absence of a latch to hold together the lever arm and yoke, which instead has a handle on one side to pull the yoke

and lever arm onto the mould cover. A short handle on tine' mould cover makes it easy to swing it back for filling. A welded-on stop, however, prevents it from being turned too far back, in which position distortion and breakage are inevitable.

The lever arm is a length of pipe with one end curved, to avoid inserting the wrong end into the socket and minimize the risk of injuries associated with straight projecting parts with sharp corners. Transportation is greatly facilitated to pushing the lever arm through two projecting rings at the side of the press. The machine is carried between two workers, each holding one end of the lever with one hand, and a handle at the side of the mould box with the other.

Operating the VS Cinva Ram

The manual operations of this machine are the same as those of the original CINVA-Ram, except that the lever arm and yoke need not be held together with a latch.

Apart from frequent oiling of the mould, regular lubrication of all moving parts and daily cleaning, no special maintenance is required.

Technical Details

Size of machine (length x width x height)	45 x 30 x 70 cm (18 x 12 x 28 in)
Weight of machine	71 kg
Size of crate for shipment	60 x 40 x 80 cm (24 x 16 x 32 in)
Weight of packed machine	100 kg
Standard block size (single mould)	30 x 14 x 12 cm (11.8 x 5.5 x 4.7 in)

Standard block size (single mould)	30 x 14 x 12 cm (11.8 x 5.5 x 4.7 in)
Maximum nominal compaction force	8 tonnes
Nominal compaction pressure	1.9 N/mm² (280 p.s.i.)
Compression ratio	1.50: 1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate	1 /40 blocks per hour
Labour force required (incl. excavation and mixing)	6 men

Price (ex works) valid June 1988	VS Cinva Ram (depending on size of order)	300 - 400 US$

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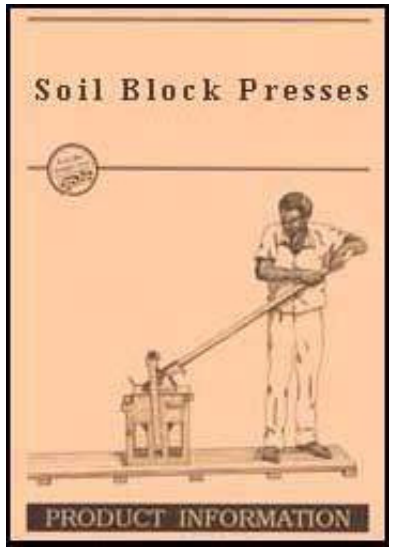

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Terstaram hand operated press

Manufacturer
APPRO-TECHNO
24 Rue de la Rieze
B-6404 Couvin - Cul-des-Sarts
Belgium
Tel. 60 37 76 71
Tlx. 516 22 ap tec b

Description

The TERSTARAM press is based on the design of "La Madelon", the famous Belgian machine developed at the beginning of the 20th century, which was later successfully manufactured under the names "Stabibloc" and "Landcrete" in different parts of the world. While the earlier machines were designed to produce compressed bricks for firing, with the possibility of making unfired soil bricks, the TERSTARAM press is sturdier than its predecessors and specifically constructed to manufacture compressed soil blocks, but can also be used to produce clay elements for firing.

The main advantages of the design are the possibility of using various different moulds which take just 15 minutes to change; the mobility of the machine, which can easily be moved by two men, and the good compaction of the bricks, exerting an exceptionally high pressure for a manually operated press with mechanical

energy transmission.

Operating the TERSTARAM

The unclamped lid of the mould is held open by a weight at the rear end so that the mould can be filled with a shovel The soil is precompacted by forcefully closing the lid, which is held in place by a clamp. The two lever arms on either side of the machine are simultaneously turned by two men in order to compact the soil.

After completing compaction, the lid is unclamped and opened. By turning the lever arms in the reverse direction, the finished product is pushed upwards and can be removed for drying. A small lever arm beside the mould is pulled sideways to lower the mould base for the next production cycle.

APPRO-TECHNO Training Program

A 4-week training course can be provided for technicians and artisans, either at their home base, or in Belgium (APPRO-TECHNO, Couvin), or in France (CRATerre, Grenoble).

The course covers all aspects of soil block production and can be summarized as follows:

Week 1: Theoretical study of soil characteristics, identification tests, principles of stabilization, design criteria.

Week 2: Selection and excavation of suitable earth, pulverization and mixing,

principles of compression, handling and maintenance of presses, quality control.

Week 3: Plant design, organization, management, feasibility studies, visits to block plants. Week4: Study of design and construction principles for earth structures, principles of surface protection, disaster mitigation and building maintenance.

Technical Details		
Size of machine (length x width x height)		135 x 70 x 90 cm (53 x 28 x 35 in)
Weight of machine (without mould)		340 kg
Weight of standard sized brick mould		40 kg
Size of crate for shipment		150 x 55 x 102 cm (59 x 22 x 40 in)
Weight of packed machine		550 kg
Standard brick size (double mould), each	a.	22.5 x 10.5 x 6 cm (8:9 x 4.1 x 2.4 in)
Standard block size (single mould)	b.	29.5 x 14 x 9 cm (11.6 x 5.5 x 3.5 in)
Standard block size (single mould)	c.	40 x 20 x 10 cm (15.7 x 7.8 x 3.9 in)
Maximum nominal compaction force		15 tonnes
Nominal compaction pressure		3.6 N/mm² (520 p.s.i.)
Compression ratio (for 60 mm blocks) by just pressing		1.44:1
Energy input/transmission		manual/mechanical

No. of bricks per cycle/output rate	a.	2 / 180 bricks per hour
No. of blocks per cycle/output rate	b.	1 /90 blocks per hour
No. of blocks per cycle/output rate	c.	1 / 70 blocks per hour
Labour force required (incl. excavation and mixing)		5 - 7 men

Price (ex works)	TERSTARAM Standard	45315 FB (approx. 1240 US$)
valid	TERSTARAM Special	48900 FB (approx. 1340 US$)
June 1988	Double mould a	8320 FB (approx. 230 US$)
	Single mould b	7510 FB (approx. 205 US$)
FB = Belgian Francs	Single mould c	8910 FB (approx. 245 US$)
	Packing for TERSTARAM Standard	2750 FB (approx.75 US$)
	Packing for TERSTARAM Special	3100 FB (approx. 85 US$)

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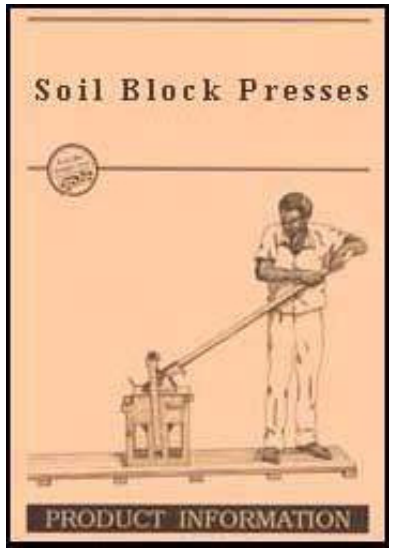

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Semi-terstamatique motor operated press

Description

The SEMI-TERSTAMATIQUE machine is a completely revised version of the "La Majo" press, formerly manufactured by "Atelier de Construction de Villers-Perwin". The machine is a motorized press, supplied either with a 2 hp electric motor or 5 hp diesel engine. An oversized Renault car clutch controls and drives the press.

The machine is designed to withstand intensive and rough usage, even under critical climatic conditions, and is easy to maintain with a few tools. A powerful spring in thrust system protects the press against poor quality soils or overfilling of moulds.

Various types of bricks and tiles (for air-drying or for firing) can be produced, as well as salt bricks for livestock. The moulds can be changed within 15 minutes. Special moulds can be made to order up to a maximum size of 40 x 20 x 10 cm. The SEMI-TERSTAMATIQUE is supplied with narrow tables on either side of the mould to facilitate filling the mould and removing the finished products.

Operating the SEMI-TERSTAMATIQUE

The mould is filled with a shovel and the lid closed manually (pre-compaction). The automatic mechanical compression (by a vertical stroke piston) and fuming out cycle is set in motion manually. Three workers are normally required to fill the mould, operate the press and remove the blocks for drying. Each production cycle requires 12 to 14 seconds.

Additional Equipment

EARTH PULVERIZER, powered by an electric motor (2.2 kW) or by a 5 hp Hatz diesel engine to produce a homogeneous soil, free from clay lumps and large particles, for better quality bricks and tiles. The earth is pulverized by means of two counterrotating cylinders (squirrel cage), achieving a maximum out put of 9 m^3/h.

PLANETARY MIXER, powered by a 5.5 kW electric motor or a 9 hp Hatz diesel, required to obtain a thorough and uniform soil mixture (also suitable for mixing concrete). The mixer is designed for low energy consumption; the rotating paddles are easily removed for cleaning; and transportation is facilitated by two pneumatic wheels. The practical capacity of the mixer is 200 litres.

Technical Details

Size of machine (length x width x height)		220 x 65 x 110 cm (87 x 26 x 16 in)
Weight of machine (without mould)		840 kg
Weight of standard sized mould		40 kg

Weight of standard sized mould		40 kg
Size of crate for shipment		227 x 75 x 112 cm (90 x 30 x 18 in)
Weight of packed machine		1000 kg
Standard brick size (double mould), each a.		22.5 x 10.5 x 6 cm (8.9 x 4.1 x 2A in)
Standard block size (single mould)	b.	29.5 x 14 x 9 cm (11.6 x 5.5 x 3.5 in)
Maximum nominal compaction force		15 tonnes
Nominal compaction pressure		3.6 N/mm² (520 p.s.i.)
Compression ratio		1.44: 1
Energy input/transmission		motorized/mechanical
No. of bricks per cycle/output rate	a.	2 /400 bricks per hour
No. of blocks per cycle/output rate	b.	1 / 200 blocks per hour
Labour force required (incl. excavation and mixing)		6 - 8 men

Price (ex works)	SEMI-TERSTAMATIQUE (electric)	347000 FB (approx. 9500 US$)
valid	SEMI-TERSTAMATIQUE (diesel)	374000 FB (approx. 10300 US$)
June 1988	Moulds a.	8320 FB (approx. 230 US$)
	b.	7510 FB (approx. 205 US$)
FB Belgian Francs =	Packing	5900 FB (approx. 165 US$)

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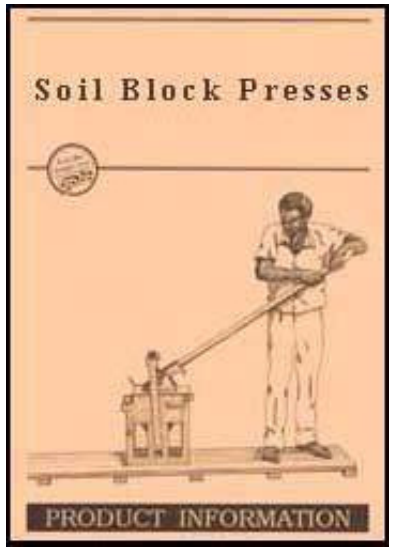

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CINVA- ram
CETA- Ram
CTA triple - block press
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DSH hydraulic press

Manufacturer
La Mecanique Regionale
23, rue de la Gare
F-51 140 Muizon
France
Tel. 26 02 95 75
Tlx. 306 022 lmr f

La Mecanique Regionale

The manufacturer of the DSH is a French firm which specializes in the production of mechanical and hydraulic equipment, as well as various innovative items that are outside the range of normal specifications.

Along with the supply of equipment, La Mecanique Regionale cooperates with a group of experts to provide a wide range of services: - Consultancy and expert analysis (including feasibility studies, soil analysis, block manufacture tests, etc.).

- Building design (architectural and engineering services, advice on most appropriate construction technique, detailing, etc.).

- Training courses (in earth construction techniques, manufacture of earth blocks, use, maintenance and repair of equipment, production management, site supervision, and other relevant issues).

The services can be provided in France or in the client's country, and the type and duration of services depend entirely on the client's requirements.

Description

The DSH hydraulic press is a further development of the DSM manual press, designed to improve the production rate and mechanical characteristics of the blocks (by time-saving, simultaneous operations and higher pressure). The DSM and DSH presses were developed by C.T.B.I., a French firm that used to specialize in earth and wood construction.

The principal feature is the rotating table with three moulds, which successively move three times to complete one production cycle (that is, filling of the mould, compression of the soil, and finally, ejection of the block).

The machine is normally supplied with an electric motor, but it is also available with a diesel engine or as a manual press, without any form of motorization (for use in remote areas or places where power or fuel supplies are limited and expensive).

A base frame of hollow steel profiles is provided for easy transportation with a fork-lift but alternatively the DSH press can be mounted on a self carrying chassis equipped with two wheels, for better mobility on the site or for towing on roads.

Operating the DSH

A minimum of two workers is required to ensure an efficient and continuous production of earth blocks with the DSH machine, the main functions being the filling of the moulds, the turning of the rotating table, monitoring and adjusting of the pressure at the end of the compression cycle, and removal of the ejected blocks.

A work force of 3 to 6 people is needed to quarry, transport and prepare the soil mix, which is best heaped close to the press, in order to facilitate the filling of the moulds with a shovel. The ergonomically designed machine with the mould opening at about waist level enables the worker to assume the most convenient and least tiring working posture when filling the moulds.

By pulling the lever at the top of the press, the table turns 120°, bringing the filled

mould into the compressing position. Compression begins automatically by two vertical stroke hydraulic jacks acting from above and below. The compression pressure is adjustable and compaction is completed in 12 to 13 seconds. Simultaneously, the next empty mould is filled with earth. When both operations are complete, the table is again turned 120° by pulling the lever.

At the third position, the compacted block is automatically ejected for convenient removal and stacking. Again the next empty mould is filled simultaneously, while the second block is being compacted and so on. Each cycle takes about 20 seconds, depending on the efficiency of the workers, so that the theoretical output for motor-driven machines is 180 blocks per hour Manually operated presses can produce about 130 blocks per hour (theoretical output).

Technical Details

Size of machine (length x width x height)	160 x 90 x 125 cm (63 x 36 x 50 in)
Weight of machine	500 kg
Size of crate for shipment	170 x 100 x 130 cm (67 x 40 x 52 in)
Weight of packed machine	560 kg
Standard block size (single mould)	30 x 15 x 12 cm (11.8 x 5.9 x 4.7 in)
Maximum nominal compaction force	15 tonnes
Nominal compaction pressure	3.3 N/mm² (475 p.s.i.)
Compression ratio (adjustable)	between 1.5: 1 and 1.64: 1
Energy input/transmission	motorized/hydraulic
No. of blocks per cycle/output rate	1 / 130 blocks per hour

No. of blocks per cycle/output rate	1 / 150 blocks per hour
Labour force required (incl. excavation and mixing)	6 - 8 men

Price (ex works)	DSH (with electric motor)	75000 FF (approx. 12900 US$)
valid June 1988	DSH (with diesel engine)	85000 FF (approx. 14600 US$)
	DSH (manual)	50000 FF (approx. 8600 US$)
FF = French Francs	Packing for shipment	3000 FF (approx. 520 US$)

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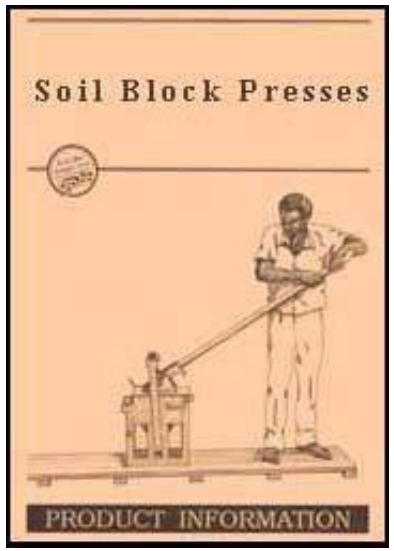

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CETA- Ram
CTA triple - block press
CRATerre America Latina press
UNATA 1003 and 1004
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Ceraman manual press

Manufacturer
CERATEC
Rue du Touquet 228
B-7793 Ploegsteert
Belgium
Tel. (056) 58 86 45
Tlx. 57 834 plocer b
Fax. (056) 58 7101

Description

The CERAMAN manual press follows an old Belgian tradition of Brickmaking machines. The earliest versions of this machine were developed more than 80 years ago. It has beers used in almost every country, on the basis of which it has been continuously improved. The major feature of the CERAMAN manual press is the automatic unlocking of the cover and automatic ejection of the compressed bricks.

The filling of the mould, pressing the two levers for compaction and removal of blocks, all take place at waist level, which is ergonomically extremely efficient and convenient. The main advantage is, however, that a large variety of moulds can be used on the same machine, to produce plain and perforated bricks, paving tiles and even roofing tiles to be fired in a kiln. The moulds can be changed within a few minutes.

The robust all-steel press is fitted with wheels for mobility from site to site. The CERAMAN is available as Type S, producing bricks up to 7 cm high, Type H for 9

cm blocks and Type X for 10 cm blocks.

Operating the CERAMAN

With shovels, the soil mix is piled onto the open mould. The cover is then pushed down forcefully, displacing the excessive soil and precompacting the contents of the mould. The cover is held down with a clamp and compaction of the bricks is effected by turning and pressing down two lever arms. This is done by two men standing on either side of the machine.

When releasing the pressure by turning the lever arms in the reverse direction, the clamp opens and the bricks are automatically ejected. These are immediately removed by hand and placed in the drying area.

The CERATEC Philosophy: Transfer of Know-how

The CERATEC philosophy and principles arc not only to supply machinery, but to provide a complete and reliable solution to its customers together with a real transfer of technology. This transfer of technology includes, amongst others, the choice and analysis of soil, feasibility studies, technological training program in Belgium, on-site start-up and technical follow up for the first two years. CERATEC carries out expertise missions for existing or future brickworks and organizes local training seminars on industrial brickmaking, tilemaking and stabilized earth blocks. CERATEC can also provide constructive plans of a large variety of kilns.

In the 5 weeks technological training in Belgium the trainees learn:

· how to carry out soil analysis

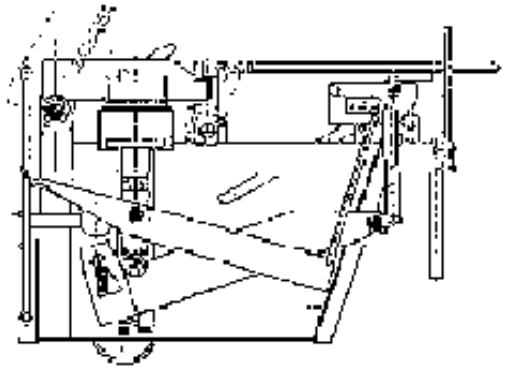
· production of compressed blocks as well as fired clay bricks and tiles;

· operation maintenance and repair of production equipment

· construction and operation of kilns

· management of brickworks and production units for compressed soil blocks;

· masonry skills and use of other building materials.



FIGURE

Technical Details

Size of machine (length x width x height)		140 x 50 x 100 cm (55 x 20 x 40 in)
Weight of machine (without mould)		370 kg
Weight of standard sized double brick mould		25 kg
Size of crate for shipment		149 x 66 x 116 cm (59 x 26 x 46

		in)
Weight of packed machine		610 kg
Standard brick size (double mould), each a.		22 x 10.7 x 7 cm (8.7 x 4 x 2.8 in)
Standard block size (single mould)	b.	29.5 x 14 x 8.8 cm (11.6 x 5.5 x 3.5 in)
Standard block size (single mould)	c.	40 x 20 x 10 cm (15.7 x 7.8 x 3.9 in)
Maximum nominal compaction force		10 tonnes
Nominal compaction pressure		2.1 N/mm² (305 p.s.i.)
Compression ratio (for 70 mm block) by just pressing		1.50: 1
Comp. ratio (including dynamic compaction by closing the cover)		±2: 1
Energy input/transmission		manual/mechanical
No. of bricks per cycle/output rate	a.	2 / 300 bricks per hour
No. of blocks per cycle/output rate	b.	1 / 150 blocks per hour
No. of blocks per cycle/output rate	c.	1 / 100 blocks per hour
Labour force required (incl. Excavation and mixing)		5 men

Price (ex works)	CERAMAN Type S	a	1900 US$
December 1987	CERAMAN Type H	b.	2030 US$
	CERAMAN Type X	c	2070 US$
	Moulds (plain bricks, paving tiles)		270 US$

	(perforated bricks)		650 US$
	(roofing tiles)		380 - 670 US$
	Spare parts package		250 US$

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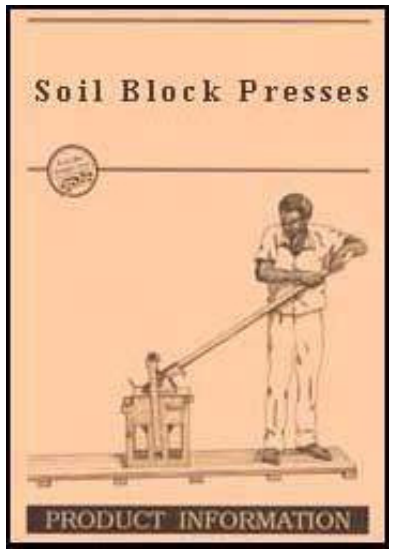

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Ceramatic automatic brick press

Description

The CERAMATIC brick press with a fixed output rate is an all-mechanical

automatic machine with a 3-station rotating table, comprising a filling station, a moulding station and a de-moulding station. The entire cycle of pressing, ejecting and fuming the table is operated by motor power through an electrical motor, diesel or petrol engine. The bricks are pressed at high compaction pressures through a mechanical lever system. The production rate can be determined in advance through the choice of a larger or smaller fly-wheel Fitted on a robust base frame with four wheels, the CERAMATIC can easily be moved from site to site.

Moulds for special brick sizes are available on request. Alternative to the standard CERAMATIC press, a hydraulic version exists, Type H. which produces bricks of greater heights at even higher compaction pressures.

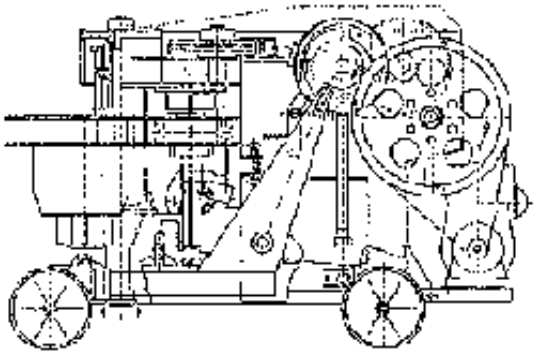
Operating the CERAMATIC

Once the machine is in operation the moulds at the filling station are constantly filled by a worker using a shovel. The rotating table turns every 2 to 3 seconds so no pauses are necessary. The over-filled moulds pass under a cone-shaped roller, which removes the excessive soil and pre-compacts the contents of the moulds.

When the compressed bricks are ejected at the de-moulding station, a worker immediately removes the bricks and places them on a wheelbarrow, which is then taken to the drying area.

Additional Equipment

CERADES H2 soil disintegrator, comprising 2 counterrotating hollow drums driven by an electrical or diesel motor, specially developed for use with the manual and automatic presses.



FIGURE

Technical Details

Size of machine (length x width x height)		200 x 100 x 140 cm (80 x 40 x 55 in)
Weight of machine (with motor / without motor)		2040/1950 kg
Size of crate for shipment		226 x 114 x 166 cm (89 x 45 x 65 in)
Weight of packed machine		2400 kg
Standard brick size (double mould), each	a.	22 x 10.7 x 7 cm (8.7 x 4 x 2.8 in)
Standard block size (single mould)	b.	29.5 x 14 x 7 cm (11.6 x 5.5 x 2.8 in)
Maximum nominal compaction force		30 tonnes
Nominal compaction pressure		6.3 N/mm² (910 p.s.i.)
Compression ratio (for 70 mm brick) by pressing		1.86: 1
Comp. ratio (including precompaction by conical roller)		± 2: 1
Energy input/transmission		motorized/mechanical
- Type ME:		4 h.p. electrical motor (1500 rev/min, voltage on choice)

- Type MD:		5 h.p. diesel engine (1500 rev/min, av. consumption 0.6 l/hour)
No. of bricks per cycle/output rate	a.	2/ 1400 - 2000 bricks per hour
No. of blocks per cycle/output rate	b.	1 / 700 - 1000 blocks per hour
Labour force required (minimum)		
- to operate the machine		2 men
- to excavate and prepare the soil, depending on the level of mechanization		4 - 10 men

Price (ex works)	CERAMATIC Type ME	17100 US$
December 1987	CERAMATIC Type MD	18200 US$
	CERAMATIC Type H (hydraulic)	on request
	Spare parts package	1770 US$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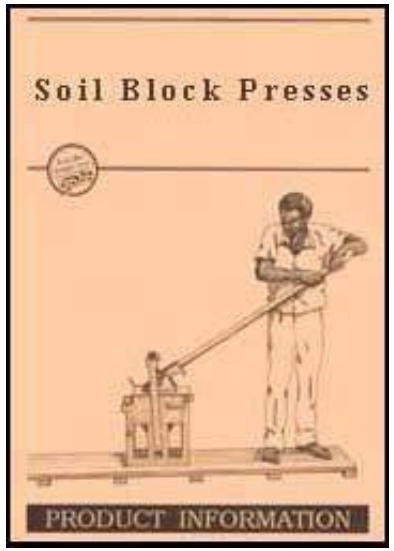

- Checklist for potential buyers
- Press - bloc 80 tm mobile production unit
- Kit 15/30 megabrik
- CLU 3000 soil brick plant
- Multibloc BREPAK block press
- TEK- Block Press
- Vs CINVA ram
- Terstaram hand operated press
- Semi-terstamatique motor operated press
- DSH hydraulic press
- Ceraman manual press
- Ceramatic automatic brick press
- Pact 500 mechanical press
- Dynaterre 01. 4 m mobile production unit
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Pact 500 mechanical press

Manufacturer
ALTECH - Societe Alpine
de Technologies Nouvelles
Rue des Cordeliers
F-05200 Embrun
France
Tel. 92 43 21 90
Tlx. 420 719

Description

The PACT 500 is a further development of the PACT 315, which was first produced in 1983, and conceived for high-output site production of superior quality compressed soil blocks.

The machine is a motorized press, powered by a 2 hp electric motor. It has a fixed hopper and a 4-station rotating plate, which is either turned manually or motor driven. A chassis with removable wheels and pole for low speed hauling, as well as pneumatic brickyard wheels instead of two feet are delivered with each

machine.

The blocks are compressed by a vertical stroke piston which is operated mechanically by a cam, achieving a maximum pressure of 8 N/mm². Each stroke is monitored by springs for compensation and an electronic torque [imitator. Special consideration has also been given to safety precautions, the most clearly visible one being the protective screen around the moving parts around the top of the rotating plate.

A variety of moulds is available for different block sizes. For each new block size, the four moulds, the two pistons (compacting and ejecting), the reception pallet (for removal of blocks) and the porch height wedges have to be changed. The whole operation takes about 40 minutes.

The type of electric motor, either 220V (mono) or 380 V (three phase) is optional.

ALTECH Training Program

The efficiency of production and the quality of the products depend largely on the know-how and skill of the operators and the organization of the production site.

ALTECH offers practical training courses for all those concerned with stabilized or unstabilized compressed soil block production and utilization. The courses are tailored to the requirements of the trainees, taking into account their level of know-how and skills.

The courses generally cover:

· selection and excavation of appropriate soils;

· preparation of the most suitable soil mix;

· production of compacted blocks with the PACT 500, stacking and curing of blocks;

· site organization;

· principles of design and construction of buildings made with earth blocks.

Operating the PACT 500

The hopper is filled either manually by means of shovels, or through a continuous supply discharged from the mixer, positioned at a higher level (eg on a trailer or truck), so that the hopper is fed by gravitation.

The moulds have only vertical parallel sides and arc open at the bottom. The soil rests on the fixed table (under the rotating plate) and slides along it, when the plate moves.

Once the mould under the hopper is filled, it is turned 90° to the next station, thereby levelling the top surface to obtain a uniform volumetric dosage, which is exposed for inspection by the worker in charge of the machine operation controls.

At the next station, the block is compacted by the mechanical press, which takes S seconds to complete. This determines the minimum duration of the fuming out cycle, which is 6 seconds achieving a maximum theoretical output of 600 blocks

per hour.

At the last station, the block is pushed by a vertical stroke piston downwards through the open mould base onto a small pallet with a hinged arm. The weight of the block makes the arm tilt out for easy removal of the finished block, after which the pallet moves back to receive the next block.

The only maintenance requirements are weekly greasing of bearings and sliding parts.

Technical Details

Size of machine (length x width x height)		130 x 100 x 130 cm (51 x 40 x 51 m)
Weight of machine		600 kg
Size of crate for shipment		120 x 110 x 140 cm (48 x 44 x 55 in)
Weight of packed-machine		750 kg
Standard block size (single mould)	a	29.5 x 20 x 10 cm (11.6 x 7.8 x 3.9 in)
Standard block size (single mould)	b	29.5 x 14 x 9 cm (11.6 x 5.5 x 3.5 in)
Standard brick size (double mould), each c		23 x 11 x 7 cm (9 x 4.3 x 2.7 in)
Maximum nominal compaction force (depending on filling)		30 - 40 tonnes
Nominal compaction pressure (depending on mould		4 - 8 N/mm² (580 - 1160 p.s.i.)

Nominal compaction pressure (depending on mould size)		4 - 8 N/mm² (580 - 1160 p.s.i.)
Compression ratio		1.8: 1
Energy input/transmission		motorized /mechanical
No. of blocks per cycle/output rate	a.	1 / 250 blocks per hour
No. of blocks per cycle/output rate	b.	1 / 250 blocks per hour
No. of bricks per cycle/output rate	c.	2 / 500 bricks per hour
Labour force required (incl. excavation and mixing)		6 - 8 men

Price (ex works)	PACT 500	83000 FF (approx. 14300 US$)
valid June 1988	Additional	
	set of moulds	2600 to 5800 FF (approx. 450 to 1000 US$)
FF = French Francs	Packing included in the price of the machine	
	Spare parts package	3200 FF (approx. 550 US$)

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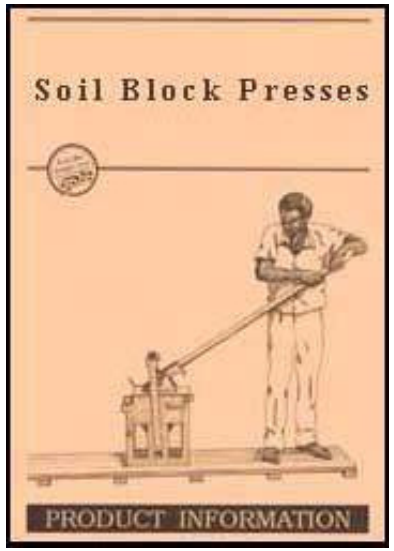

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Dynaterre 01. 4 m mobile production unit

Manufacturer
Ets RAFFIN
700 route de Grenoble
BP 9 Domene
F-38420 Le Versoud
France
Tel. 76 77 15 27
Tlx. 320 802

Description

The DYNATERRE range of machines is based upon research on the production of earth blocks by static and dynamic compression by vibration. The research was conducted in cooperation with the School of Architecture of Saint Etienne

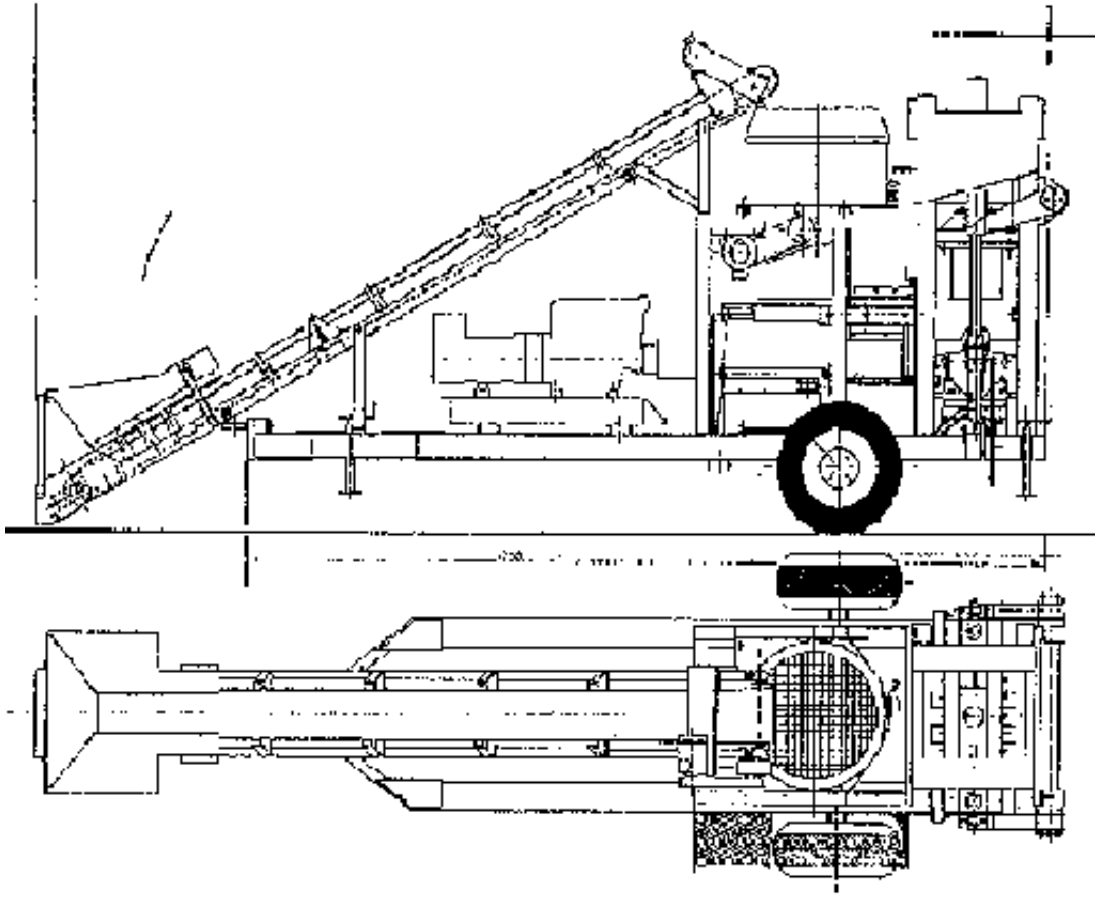
(France), under the guidance of Dr. Andre Acceta.

The DYNATERRE 01.4 M is a mobile production unit, fixed on a self-carrying chassis equipped with 2 wheels, which comply with the highway code requirements for heavy vehicles.

The production unit incorporates a conveyor belt, a 365 I planetary mixer, a water tank with a motor-pump and a spraying device, a hopper and a hydraulic press. The unit is powered by a 24 kW electric motor; a 40 hp diesel generator set with a 35 kVA alternator is optional. Energy consumption is 12kW/h, achieving mechanical and hydraulic working pressures between 3 and 25 N/mm².

The outstanding feature is that the soil is vibrated during compression (dynamic compression), whereby the soil particles are allowed to settle naturally filling the cavities and avoiding excessive internal friction or vacuum. As a result, the compaction of the soil is more effective and is achieved with less energy input than would be necessary without vibration. The vibration frequency is 50 Hz, vibration amplitude is 3 mm. The compression is carried out by a vertical stroke hydraulic jack while the ejection of the blocks is done mechanically.

On account of the dynamic compression system, the DYNATERRE 01.4 M can also be used to produce concrete blocks, solid or hollow, in all common shapes and sizes. Whether earth or concrete, 4 blocks arc produced during each turning out cycle. Each cycle takes 40 seconds, so that the theoretical output is 360 blocks/hour. The practical output is about 250 blocks/hour.



FIGURE

Operating the DYNATERRE 01.4 M

Once the mobile unit has been manouvred to a suitable position, the conveyor belt is folded down and the feet lowered to give the machine a firm support.

The hopper, mounted on the conveyor belt, is fed with earth and appropriate quantities of the stabilizer. The conveyance of these materials to the mixer is activated manually, as also the starting up of the mixer and the opening of the

hopper to release the earth and stabilizer.

Water is added directly into the mixer by a motorized pump (equipped with a flow regulator) through a sprinkling bar.

All the following operations (filling of the moulds, vibrating, compressing, turning out and ejecting) are successively set in motion manually with the possibility to repeat certain operations (by backward movement).

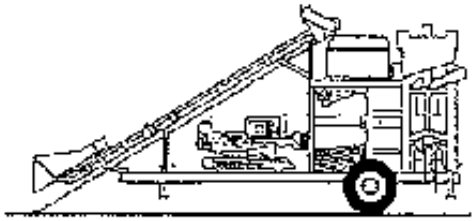
Without excavating, transporting and preparing the soil, 5 - 6 workers are required to operate the DYNATERRE 01. 4 M, producing about 4 blocks per minute.

The DYNATERRE Range of Machines

A variety of larger sized production units are available. These are not different types of machines to chose from, but more a question of addition of several components, which serve to incorporate more functions, improve the quality of the products and/or increase the production rate to the extent of an industrial unit.

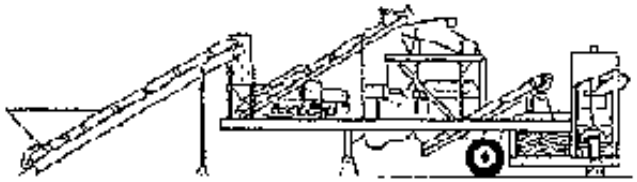
The following alternatives are possible:

DYNATERRE 01. 6 M, a more powerful version (motor, 500 I mixer) of the 01. 4 M, producing six 40 x 20 x 20 cm blocks per cycle, and theoretical output of 540 blocks/hour.



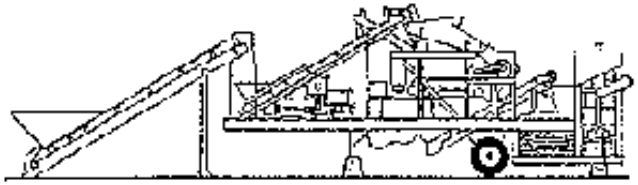
FIGURE

DYNATERRE 03,same as 01.6 M, plus a pulverizer, a vibrating sifter and a binder proportioner.



FIGURE

DYNATERRE 04, same as 03, plus a grinder.



FIGURE

Other Machines and Equipment

The following is a selection of other heavy duty machines and equipment, produced by Raffin, for the large-scale quarrying and handling of building

materials:

· paddle wheel

· jet crusher

· impact crusher

· rod mill

· mobile screening and grinding unit

· screens, conveyor belts, hoppers

· stone cutting machine

Technical Details

Size of machine (length x width x height)		790 x 240 x 360 cm (311 x 95 x 142 in)
Weight of machine (without mould)		6000 kg
Size of folded up machine for shipment		580 x 240 x 360 cm (228 x 95 x 142 in)
Weight of machine for shipment (no packaging required)		6000 kg
Hollow or solid block size (4 at a time), each	a.	40 x 20 x 20 cm (15.7 x 7.9 x 7.9 in)

Hollow or solid block size (4 at a time)	b.	40 x 15 x 20 cm (15.7 x 5.9 x 7.9 in)
Hollow or solid block size (4 at a time)	c.	40 x 10 x 20 cm (15.7 x 3.9 x 7.9 in)
Maximum nominal compaction force		35 tonnes
Nominal compaction pressure		1 N/mm² (145 p.s.i.)
Compression ratio		2: 1
Energy input/transmission		motorized / hydraulic and mechanical
No. of blocks per cycle/output rate	a.	4 / 250 blocks per hour
No. of blocks per cycle/output rate	b.	4 / 250 blocks per hour
No. of blocks per cycle/output rate	c.	4 / 250 blocks per hour
Labour force required (incl. excavation and mixing)		8 - 10 men

Price (ex works)	DYNATERRE 01. 4 M	482800 FF (approx. 83000 US$)
valid June 1988	DYNATERRE 01. 6 M	545000 FF (approx. 94000 US$)
	DYNATERRE 03	825000 FF (approx. 142000 US$)
FF = French Francs	DYNATERRE 04	928350 FF (approx. 160000 US$)
	Moulds	on request (One set is included in the price of the machine.)

	Spare parts package	included in the price of the machine.

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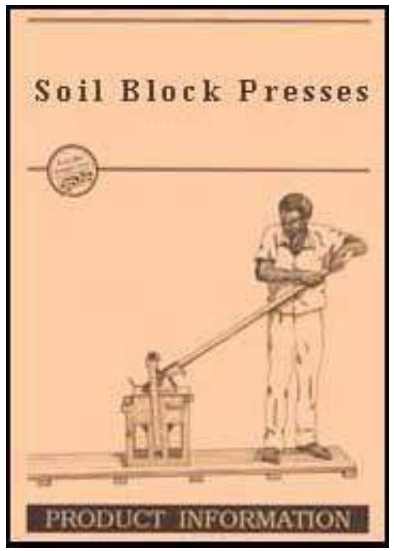

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Pact 500 mechanical press
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CETA- Ram
CTA triple - block press
CRATerre America Latina press
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Acknowledgements

GATE stands for German Appropriate Technology Exchange. GATE is a division of the Deutsche Gesellschaft fr Technische Zusammenarbeit (GTZ) GmbH, a federal organization commissioned by the Government of the Federal Republic of Germany

with the planning and implementation of Technical Cooperation activities with countries of the Third World.

GATE currently works in the fields of dissemination of appropriate technologies, environmental protection and conservation of natural resources. Within the GTZ, GATE is responsible for the activities on a cross-sectoral basis.

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- cooperation agreements with NGO's in Africa, Asia, Oceania and Latin America

- information service: documentation, exchange of information, question and answer service, publication of technical brochures, articles and a technical journal.

2) Environmental protection and conservation of natural resources

- coordination of environmental protection activities at GTZ.

- further development of methods and instrumeets for environmental impact assessment

- technical backstopping and coordination of interdisciplinary and multisectoral projects in the field of environmental protection and conservation of natural resources.

- cooperation with the relevant national and international organisations, associations and offices concerned with this sector

**German Appropriate Technology Exchange Daf-Hammarskjold-Weg 1
Postfach 5180
D-6236 Eschborn 1
Federal Republic of Germany
Tel. (06196)79-0
Tlx. 407501-0 gtz d**

This Product Information Portfolio was conceived to inform users as objectively as possible about earth construction in general, and more specifically about the production of compressed soil blocks and the available soil block presses, as well as aspects of selecting and buying the most suitable one. The aim was not to deal with the technology in depth, as sufficient literature is available elsewhere, but to give practical information for the user to understand the advantages and limitations of the alternative technical systems and equipment available in different regions.

This enables the user to compare the machines with each other, and make a preliminary selection, before requesting more detailed information from the manufacturer.

Note: The technical details were provided by the producers. GATE is not in a position to verify these data and therefore cannot accept the responsibility for any inaccuracies. As the prices and exchange rates are subject to change, they are only meant to serve as guidelines.

Text, illustrations and layout by:
K. Mukerji and CRATerre (1988)

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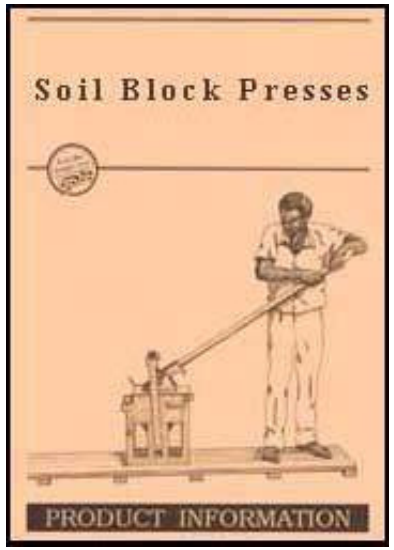

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Ellson blockmaster

Manufacturer
Kathiawar Metal & Tin Works Pvt. Ltd.
9, Lati Plot (Sadgurunagar)
P.O. Box 202
Rajkot 360 003 / India

Tel. 22 693
Cable KAMETIN

Description

The ELLSON Blockmaster which is being manufactured in India since 1959, is one of the oldest soil block presses that is still being produced. The press is a robust all-steel welded construction, and is capable of taking on interchangeable moulds to produce blocks, bricks and tiles of different sizes.

The Blockmaster has a lever-linkage toggle mechanism and high compaction is achieved by its high lever ratio the forceful closing of the lid and "jumping-pull" of the lever.

An important feature of the machine is the height of the mould off the ground, which helps to reduce back-ache from bending down to remove the ejected blocks. The operation of the lever only on one side of the machine is a further advantage.

Training courses on soil block production can be arranged by the manufacturer at the works in Rajkot.

Operating the ELLSON Blockmaster

A triangular scoop is provided for each corresponding mould size, to ensure that the mould is always filled with the same quantity of soil. When the mould is filled, the lid is slammed down and held in place with a clamp.

The two operators on the lever now swing back to complete the compression

stroke or "pull down". This should require some effort to obtain a well compacted block. If the lever offers no resistance, the mould is not sufficiently filled, if the required effort is too great for the two operators, the mould is overfilled, in which case it must be refilled with a fresh soil mix.

Once the pull-down is completed, the clamp is released and the lid opened. By further pressing down of the lever, the block is ejected clear off the top of the mould, so that it can be picked off and carried to the curing place.

Technical Details

Size of machine (length x width x height)		66 x 43 x 92 Cm (26 x 17 x 36 in)
Weight of machine (without mould)		165 kg
Weight of standard sized mould		43 kg
Weight of largest/smallest mould		57/25 kg
Size of crates for shipment	I. (Blockmaster, moulds)	81 x 64 x 128 em (32 x 25 x 50 in)
	II. (lever, inclined legs)	182 x 61 x 18 cm (72 x 24 x 7 in)
Weight of packed machine	I.	330 kg
	II.	75 kg
Standard block size (single mould)	a.	29 x 14 x 9 cm (11.5 x 5.5 x 3.5 in)
Other block sizes (single mould)	b.	29 x 19 x 9 cm (11.5 x

Other block sizes (single mould)	b.	7.5 x 3.5 in)
	c.	30.5 x 14.6 x 10 em (12 x 5.8 x 4 in)
Tiles: same as blocks,	d	30.5 x 22.8 x 10 em (12 x 9 x 4 in)
but height 5 cm (2 in)	e	22.8 x 10.8 x 7.6 em (9 x 4.3 x 3 in)
Maximum nominal compaction force (two men pulling down lever)		28 tonnes
Nominal compaction pressure		6 N/mm² (853 p.s.i.)
Compression ratio (including dynamic compaction by closing the cover)		1.7: 1
Energy input/transmission		manual/mechanical
No. of blocks per cycle/output rate	a.	1 / 90 blocks per hour
	b.	1 / 80 blocks per hour
	e	1/ 90 blocks per hour
	d	1 / 70 blocks per hour
	e.	1/ 100 blocks per hour
Labour force required (incl. excavation and mixing)	8 - 12 men	

Price (ex works)	Blockmaster (with 1 mould)	9800 Ind.Rs. (approx. 750 US$)
valid February 1988	Blockmaster (with 2 moulds)	11875 Ind.Rs.(approx. 900 US$)

Ind.Rs. = Indian Rupees		

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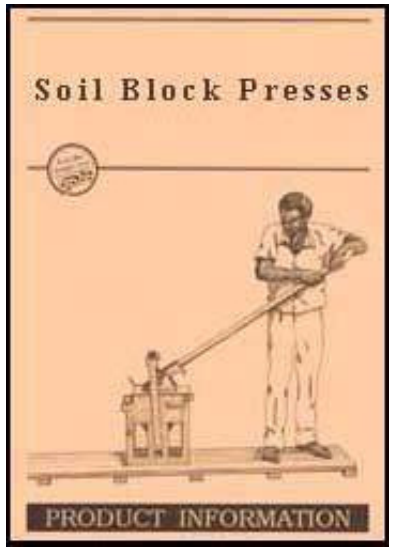

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Astram soil block machine

Manual Block Presses Produced in India 2

Manufacturer
AEROWELD INDUSTRIES
B-9, H.A.L. Industrial Estate
Bangalore 560 037 / India

Tel. 57 55 32

Description

The ASTRAM Soil BlockMachine is the lightest soil block press with interchangeable moulds. It was designed in 1980 by Professor K.S. Jagadish of ASTRA (Indian Institute of Science, Bangalore), on the basis of laboratory studies on the relations between compaction force, human effort and output rate.

The welded, all-steel machine consists of a frame, a mould and a toggle lever mechanism. The mould is provided with a stiffened plate lid which. when closed. can be locked down with a bolt locking mechanism. A scoop is provided for measuring the correct amount of soil to fill into the mould.

The high position of the mould and the lever action being only on one side, greatly facilitate block production and reduce the physical strain on the workers.

Commercial production of the ASTRAM began in 1985 and the machine is now in use in almost all parts of India.

Operating the ASTRAM

With the lever in the vertical position, the base plate is at its lowest level and the mould ready for filling. Lubrication of the side walls of the mould is advisable to facilitate ejection of the blocks. While the soil mix, measured out in the scoop, is filled in by one worker, the second worker precompacts the soil in each corner with his fingers. Further precompaction is achieved by closing the lid with some force, and clamping it down.

Only one person is required to pull down the lever until it reaches the stop, when the base plate has moved up 6 cm. The lid is unclamped and opened, so that the lever can be pushed further down to eject the block, which can be easily removed for curing.

Reference Literature

ASTRA Alternative Building Series (1981):
by Jagadish, K.S.; Venkatarama Reddy, B.V.:

1. A Manual of Soil Block Construction
2. Experiments in Building Technologies for Rural Areas, Part I: Materials and Building
3. Part II: Alternative Buildings in theUngra Region
by Venkatarama Reddy, B.V.; Jagadish, K.S.; Nageswara Rao, M.:
4. The Design of a Soil Compaction Ram for Rural Housing

Technical Details

Size of machine (length x width x height)		220 x 34 x 103 em (87 x 14 x 41 in)
Weight of machine (without mould)		75 kg
Weight of largest/smallest (standard) mould		70/63 kg
Size of crate for shipment		133 x 45 x 114 em (53 x 18 x 45 in)
Weight of packed machine		185 kg

Standard block size (single mould)	a.	30.5 x 14.4 x 10 em (12 x 5.7 x 4 in)
Standard block size (single mould)	b.	23 x 19 x 10 cm (9 x 7.5 x 4 in)
Standard brick size (double mould), each	c.	23 x 10 x 7.5 cm (9 x 4 x 3 in)
Maximum nominal compaction force		8 tonnes
Nominal compaction pressure		1.8 N/mm² (264 p.s.i.)
Compression ratio (including dynamic compaction by closing the cover)	1.7: 1	
Energy input/transmission		manual/mechanical
No. of blocks per cycle/output rate	a.	1 / 56 blocks per hour
	b.	1 / 56 blocks per hour
	c.	2 / 112 bricks per hour
Labour force required (incl. excavation and mixing)	5 men	

Price (ex works)	ASTRAM with mould	a. or b.	5000 Ind.Rs.(approx. 400 US$)
valid April 1988	ASTRAM with mould	c.	6750 Ind.Rs (approx. 540 US$)
Ind.Rs. = Indian Rupees			


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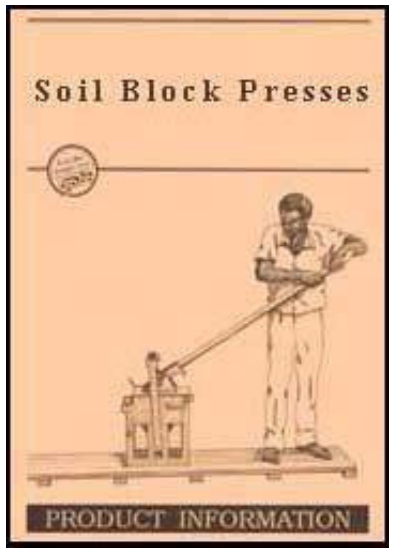

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UNATA 1003 and 1004
MARO DC Press
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Tara balram

Manual Block Presses Produced In India 3

Manufacturer
TARA
c/o Development Alternatives
22, Olof Palme Marg
Vasant Vihar
New Delhi 110 057/ India
Tel. 60 58 35 & 66 53 70
Tlx. 61 735

Description

The TARA BALRAM soil block press was developed in 1985 by S. Valmeckanathan of Development Alternatives. The aim was to produce a machine of exceptional ruggedness, achieving a high output rate, and the high sales figures since the commercial production of the machine began in 1986 clearly show the validity of the design concept.

The arc-welded steel construction has four moveable links and is designed for easy dismantling and changing of moulds. It is supplied with a steel base frame, which is bolted to the main angle iron frame to impart stability during operation. Alternatively, a strong wooden base frame can be used.

The machine also incorporates several practical details, such as guard rails attached to the lid for the safety of the operators, and a set of steel rings welded to the frame for lifting the machine with two pieces of steel pipe or bamboo.

TARA BALRAM II

A modified version of the BALRAM is being developed to achieve a higher compaction force (15 tonnes) and consequently denser blocks.

The machine will also be slightly larger and heavier than the original version, but the compression ratio, output rate and general features will be the same. In addition to the double mould for the standard brick size 23 x 10.8 x 7.5 cm, a single mould will be available to produce blocks of 30 x 14.5 x 9 cm.

Operating the BALRAM

The base plate is lowered by moving the yoke and lever to rest horizontally on the side of the mould to which the lid is hinged. The mould walls are oiled (every 5 - 6 operations) and the soil filled in, with the help of a scoop. The soil is then precompacted by closing the lid with some force, and clamping it down with the locking lever.

For compaction, the yoke and lever are moved over the mould to the other side, until it rests on the first ejection pivot. In doing so, the base plate moves up 4 cm. The lever is then lifted to about 25° above the horizontal, in order to release the locking lever, and open the lid.

By moving the lever to about 20° below the horizontal, the compressed blocks are fully ejected above the mould, ready to be lifted off and stacked for drying.

Training Courses

TARA conducts two types of training courses related to the construction of unproved lowcost housing for the rural poor.

The 3-day basic program is designed for training operators and supervisors on all aspects of the production of compacted soil blocks using the BALRAM.

The 5-day advanced program is designed to train entrepreneurs, engineers, architects, members of government and non-government organizations, and several other professionals. The course includes the entire basic program, but deals with various issues in greater depth, particularly material testing, architectural considerations and innovative construction techniques.

Technical Details

Size of machine without lever extension and base frame		
(length x width x height)		32 × 35 x 160 cm (13 x 14 x 63 in)
Weight of machine (without mould)		6 kg
Weight of standard sized double brick mould		14 kg
Required operating area for the machine		420 x 60 cm (14 x 2 ft)
Size of crate for shipment		180 x 75 x 55 cm (71 x 30 x 22 in)
Weight of packed machine		200 kg
Standard brick size (double mould), each	a.	23 x 10.8 x 7.5 cm (9 x 4.3 x 3 in)
	b	23x 10.8 x 6 cm(9x4.3 x2.4 in)
Maximum nominal compaction force		10 tonnes
Nominal compaction pressure		2.0 N/mm² (290 p.s.i.)
Compression ratio (including dynamic compaction by closing the cover)		1.8: 1
Energy input/transmission		manual/mechanical
No. of bricks per cycle/output rate	a.	2 / 124 bricks per hour
	b.	2 / 124 bricks per hour
Labour force required (incl. excavation and mixing)		5 men

Price (ex works)	TARA BALRAM	7000 Ind.Rs.(approx. 550 US$)
valid January 1988		
Ind.Rs. = Indian Rupees		

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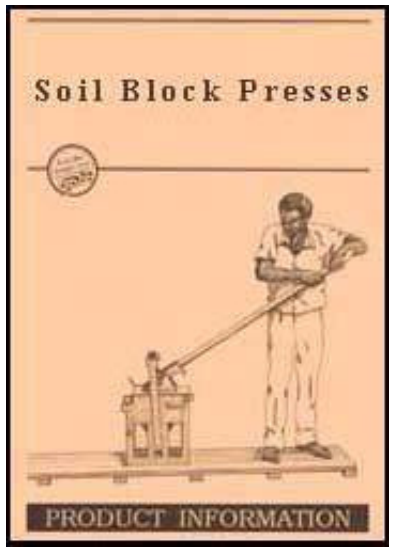

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IIT Madras cam block press

Manual Block Presses Produced in India 4

Manufacturer
Building Technology Laboratory

Civil Engineering Department
Indian Institute of Technology
Madras 600 036 / India
Tel. 42 53 42 - 260

Description

The IIT Madras Cam Block Press is the first manually operated machine to employ a cam mechanism (instead of a toggle lever) to push a plunger plate and central piston upwards to compress loose soil into blocks. The press was developed in 1986 by Professor T.P. Ganesan and R. Chandra Sekhar (M.Sc. Thesis), as part of an Indo-German project on "Appropriate Technology for Rural Housing".

The aim was to make the manual operations as simple and fluent as possible, and allow for variations in the compression ratio. The all steel machine, with interchangeable moulds for different block sizes, is assembled with bolts and nuts, so that it can be dismantled for transportation.

Alternative models of the Cam Block Press are under development to increase the efficiency for instance, by providing a ratchet to the lever so that the compression and ejection operations can both be done from the same side of the machine.

Operating the Cam Block Press

The base plate of the mould box is lowered by moving the lever down on the side opposite to the open lid. The mould walls are greased and the soil filled in with a measuring scoop. The lid is closed and locked by a simple turn of the eccentric roller type arrangement.

Two workers then lift up lift up the lever until it reaches an indicator on the side of the machine. This completes the compression phase. With the lever held in this position, the lid is unlocked and opened.

The lever is then pushed further over the top of the mould to the other side, until it is automatically blocked by catch of the cam. By this time the compressed block is completely ejected from mould and can be removed for curing.

Technical Details

Size of machine (length x width x height)	200 x 45 x 90 cm (79 x 18 x 36 in)
Weight of machine (without mould)	142 kg
Weight of standard sized block mould	16 kg
Size of crate for shipment	150 x 60 x 60 cm (59 x 24 x 24 in)
Weight of packed machine	200 kg
Standard block size (single mould)	30 x 20 x 10 cm (12 x 8 x 4 in)
Maximum nominal compaction force	15 tonnes
Nominal compaction pressure	2.5 N/mm² (365 p.s.i.)
Compression ratio (can be varied)	1.5: 1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate	1/54 blocks per hour
Labour force required (incl. excavation and mixing)	5 men
Price (ex-works) IIT Madras Cam Block Press 5000	(approx. 400 US$)

Price (ex works) IIT Madras Cam Block Press 5000 Ind.Rs.	(approx. 400 US$)
valid June 1988	
Ind.Rs. = Indian Rupees	

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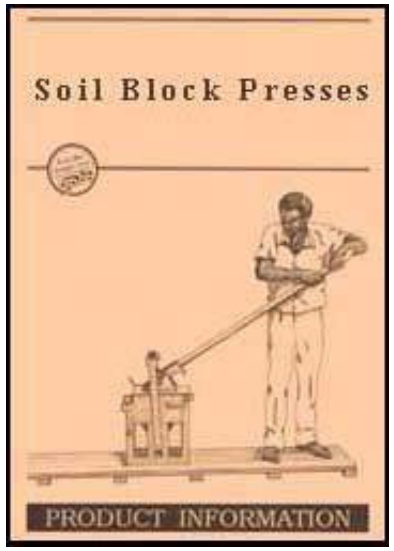

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- **Kit 15/30 megabrik**
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- **Multibloc BREPAK block press**
- **TEK- Block Press**
- **Vs CINVA ram**
- **Terstaram hand operated press**
- **Semi-terstamatique motor operated press**

DSH hydraulic press
Ceraman manual press
Ceramatic automatic brick press
Pact 500 mechanical press
Dynaterre 01. 4 m mobile production unit
Ellson blockmaster
Astram soil block machine
Tara balram
IIT Madras cam block press
CINVA- ram
CETA- Ram
CTA triple - block press
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UNATA 1003 and 1004
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CINVA- ram

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Manufacturer

METALIBEC S.A.
Apartado 11 798
Carrera 68B no. 18-30
Bogota, D.E.
Colombia
Tel. 261 32 77, 261 13 15
Tlx. 43 247

Description

The CINVA-Ram, which was designed by Raul Ramirez at the Inter-American Housing Center (CINVA) in 1956, is the oldest, truly low-cost, portable soil block press, and numerous manual presses produced in different parts of the world are based on the design and working principle of this machine.

The press, made entirely of steel, basically consists of a mould box with a cover, onto which a toggle lever is rolled. This is connected via a yoke to a piston below the mould box, which has a moveable base plate fixed to the piston. When the lever is pressed down, the piston moves upwards between two adjustable angles. The whole unit is mounted on a heavy wooden base board (about 300 x 20 x 5 cm) to provide stability during operation.

For the production of blocks and tiles, which have the same dimensions as the blocks but less thickness, inserts are provided to reduce the height. These are usually wooden blocks with a metal face and can have various shapes (so called "frogs") to produce bricks with recesses, grooves, cavities, etc. for special uses.

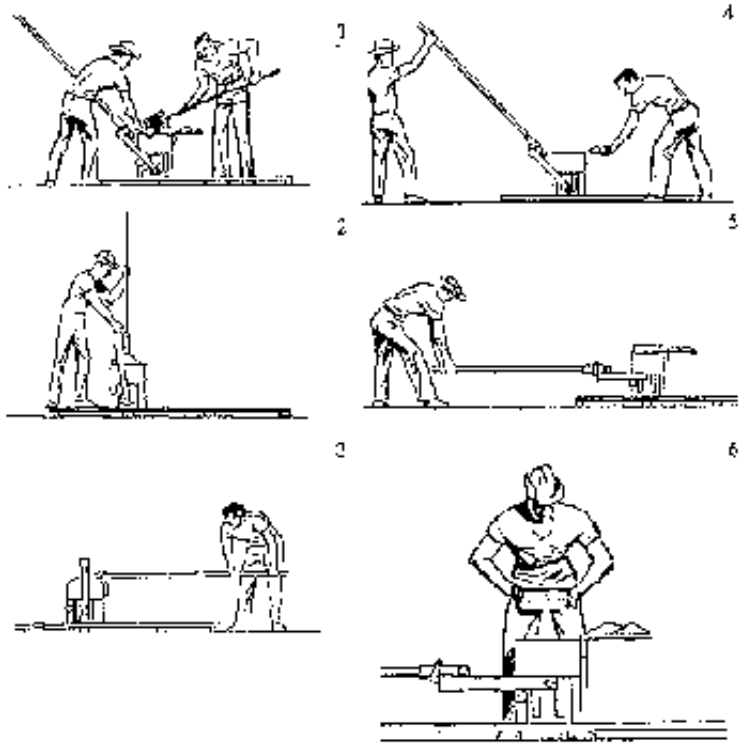
The CINVA-Ram is also distributed by: Schrader-Bellows Inc. 200 W Exchange Street Akron, Ohio 44309, U.S.A.

Operating the CINVA-Ram

In the vertical position, the lever arm is fixed to the yoke by means of a latch. These are pulled back together and the mould cover swung open. After greasing the sides of the mould, the soil mix is filled in, making sure that the corners are properly filled and slightly compressed by hand. When swinging back the mould cover the surplus soil is removed.

The lever is brought back to the vertical position and the latch released. The lever arm is then pulled down on the side opposite to its previous position, to compress the block. When the block is fully compacted, the lever arm is swung back over the mould to its position during filling.

The mould cover is opened and the lever arm depressed further until the block is completely ejected and held in this position until it is removed from the press and placed on edge at the curing site.



FIGURE

Technical Details

Size of machine (length x width x height)		41 x 25 x 51 cm (16 x 10 x 20 in)
Weight of machine		58 kg
Size of crate for shipment		29 x 70 x 49 cm (12 x 28 x 19 in)
Weight of packed machine		67 kg
Standard block size (single mould)	a.	29 x 14 x 9 cm (11.5 x 5.5 x 3.5 in)
	b.	29x 14x3.8cm(11.5x5.5xl.5in)
Maximum nominal compaction force		18 tonnes

Nominal compaction pressure		4.4 N/mm² (630 p.s.i.)
Compression ratio		1.7: 1
Energy input/transmission		manual/mechanical
No. of blocks per cycle/output rate	a.	1 / 37 blocks per hour
	b	1 / 60 blocks per hour
Labour force required (incl. excavation and mixing)		4 men

Price (ex works)	CINVA-Ram	35500 Col. $ (approx. 230 US$)
valid January 1988	(Discount of 30 US$ per unit for purchases of 10 units or more.	
	Shipping cost for export are at buyer's expense.	
Col.$ = Colombian Dollars	Spare parts, replacements and technical advice available on request.)	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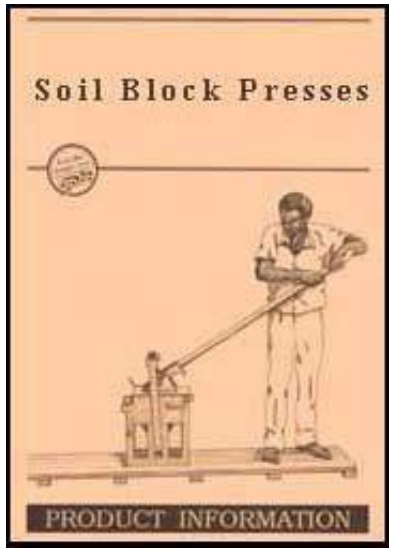

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- DSH hydraulic press
- Ceraman manual press
- Ceramatic automatic brick press
- Pact 500 mechanical press
- Dynaterre 01. 4 m mobile production unit
- Ellson blockmaster
- Astram soil block machine
- Tara balram
- IIT Madras cam block press
- CINVA- ram
- CETA- Ram
- CTA triple - block press

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CETA- Ram

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Manufacturer
CETA
Centro de Experimentacion
en Tecnologia Apropiada
Apartado 66-F
Guatemala C.A.

Description

The CETA-Ram Block Press was developed by Roberto Lou Ma, CETA, soon after the Guatemala earthquake of 1976. The CETARam is a modified CINVA-Ram for the production of hollow soil-cement blocks, intended for use in steel reinforced masonry for earthquake proof low-cost housing.

The design is essentially the same as that of the CINVA-Ram, but the piston of the CETA-Ram has two bushings, which slide along two vertical cylindrical columns (

6 cm), which are fixed to the base of the machine. These columns also serve as inserts to form the holes in the blocks. An important feature of the CETARam is that the piston guiding mechanism never needs adjustment.

An alternative model of the machine has also been developed to produce both hollow and solid blocks. The piston of the CETA- Ram II is guided independently of the cylindrical inserts that form the cavities in the blocks. Thus the inserts can be removed to make solid blocks. A special insert with dividing plate for making two half-blocks at a time has also been developed, as well as Inserts for semi-hollow (frogged), channeled and rabbeted blocks.

The CETA-Ram has three main components:
- mould with cover plate
- piston
- yoke and lever device, which are extremely easy to assemble or dismantle (for inspection, cleaning, lubricating or repairing) by fixing or removing a few cotter pins.

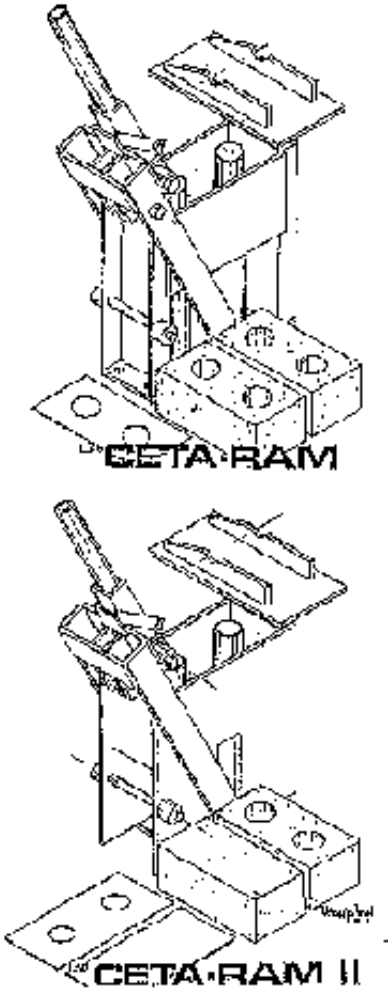
Operating the CETA-Ram

The CETA-Ram is operated in the same way as the CINVA-Ram with only one minor difference. Before filling in the soil a steel pallet is laid at the bottom of the mould and after the compacted block is ejected, a second pallet is placed on top of it. The block is then hand carried between the two pallets and carefully laid on its side on the ground, thereby freeing the pallets for immediate reuse.

The CETA-Ram Block

The dimensions of the block are 32.3 x 15.7 x 11.5 cm, with two holes of 6 cm diameter running through its full height. In properly constructed masonry walls, the holes are aligned through the full height of the wall, so that steel reinforcing rods can be inserted at suitable intervals and cement mortar grout poured in from the top, to achieve earthquake resistance.

The block dimensions have been especially conceived for modular coordination on the basis of 50 or 100 centimeters: the lengths of three blocks, including the respective joints, add up to exactly 1 meter, and 24 blocks including the respective horizontal and vertical joints, make up exactly 1 m² of masonry wall.



FIGURE

Technical Details

Size of machine (length x width x height)	40 x 25 x 70 cm (16 x 10 x 28 in)
Weight of machine	86 kg
Size of crate for shipment	50 x 30 x 80 cm (20 x 12 x 32 in)
Weight of packed machine	110 kg

Weight of packed machine	110 kg
Standard block size (single mould)	32.3 x 15.7 x 11.5 cm (12.7 x 6.2 x 4.5 in)
Nominal compaction force	10 tonnes
Nominal compaction pressure	2 N/mm² (290 p.s.i.)
Compression ratio	1.6: 1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate	1 /60 blocks per hour
Labour force required (incl. excavation and mixing)	4 men

Price (ex works)	CETA-Ram	1250 Q (approx. 500 US$)
valid May 1988	Block carrying pallets (2 required)	75 Q (approx. 30 US$)
Q = Quetzales		

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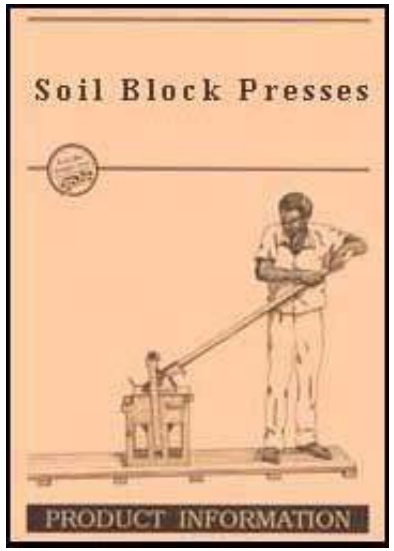

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- Ceramatic automatic brick press
- Pact 500 mechanical press
- Dynaterre 01. 4 m mobile production unit
- Ellson blockmaster
- Astram soil block machine
- Tara balram
- IIT Madras cam block press
- CINVA- ram
- CETA- Ram
- CTA triple - block press
- CRATerre America Latina press

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CTA triple - block press

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Manufacturer
Universidad Catolica
"Nuestra Senora de la Asuncion"
Centro de Tecnologia Apropiada
Casilla de Correos 1718
Asuncion
Paraguay
Tel. 31274

Description

The CTA Triple-Block Press is a modified version of the CINVA-Ram, designed to produce three soil blocks per cycle. It was developed in 1982 by Thomas Gieth and Jorge Abatte of the Centre for Appropriate Technology, Asuncion.

The principal features of the CTA Block Press are the same as those of the CINVA-Ram, except that the mould box is much larger and divided into three sections by

means of two steel plate dividers. By using the full mould space and special inserts, a great variety of components, such as large sized blocks, hollow or specially shaped blocks for earthquake resistant constructions, floor tiles and even roof tiles, can be produced.

The telescope-type lever arm consists of a 1 metre long casing of square cross-section, with a circular section pipe that can be pulled out as required, up to about 50 cm, depending on the height of the operator. The round inner component was chosen to avoid excessive friction or jamming due to earth falling between the sliding surfaces. All lever operations are carried out on one side of the press.

Operating the CTA Triple-Block Press

The procedure of blockmaking is the same as with the CINVA-Ram, except that prior to filling the mould, the two plate dividers have to be inserted in the slits.

Apart from producing three blocks per cycle, the use of the dividers has the additional advantage that the piston and base plate can only move up to the lower edges of the dividers, thus producing blocks of identical dimensions. This serves as an in-built quality control. Furthermore, straight and faultless edges are achieved by pulling out the dividers before opening the cover to eject the compacted blocks.

Another quality factor is the use of frogs, which penetrate more than half the height of the blocks, thus compacting them from within. This way bricks of relatively uniform density are obtained, approaching the quality of doubly compacted bricks.

Technical Details

Size of machine (length x width x height)	36 x 48 x 56 cm (14.2 x 18.9 x 22 in)
Weight of machine	121 kg
Size of crate for shipment	46 x 60 x 66 cm (18 x 24 x 26 in)
Weight of packed machine	140 kg
Standard block size (triple mould), each	24 x 11.5 x 11.3 cm (9.5 x 4.5 x 4.4 in)
Maximum nominal compaction force	11.6 tonnes
Nominal compaction pressure	1.4 N/mm² (200 p.s.i.)
Compression ratio	1.81: 1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate	3 / 130 - 170 blocks per hour
Labour force required (incl. excavation and mixing)	4 - 6 men

Price (ex works)	CTA Triple-Block Press	400000 ¢ (approx. 500 US$)
valid June 1988		
¢ = Guarani		


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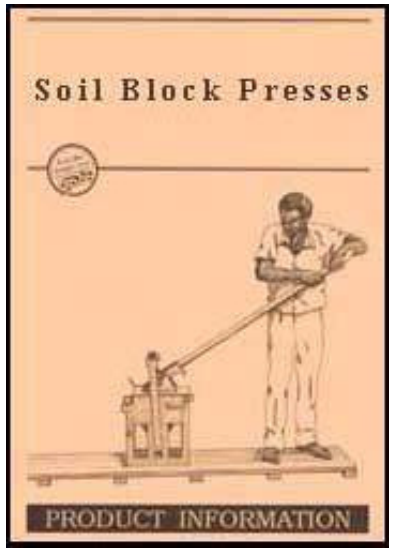

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Manufacturer
CRATerre AMERICA LATINA
Apartado Postal 5603
Correo Central
Lima 1
Peru
Tel. 14 40 60 27
Tlx. 25 201 pe pb hboli

Description

The CRATerre AMERICA LATINA press was developed in 1982 by Silvia Matuk, Francois Vitoux and Alain Hays of the nonprofit Peruvian organization so named. It was produced only for use in the organization's own projects, and is not yet available for sale.

The machine was especially designed to produce large-sized earth blocks, similar to the traditional adobe blocks, but which are more uniform and specially shaped for earthquake resistant construction (by providing horizontal and vertical grooves and cavities, into which steel and wood reinforcements are placed).

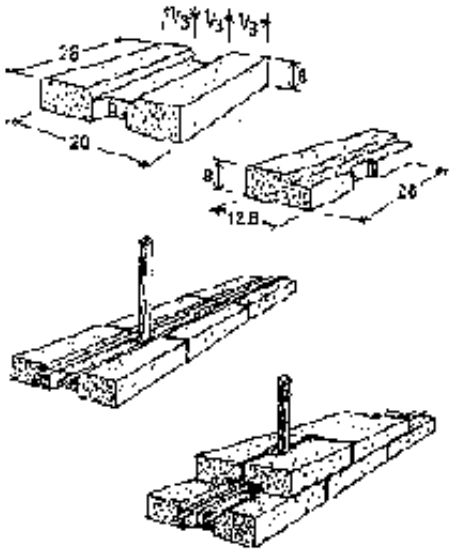
Two wheels are provided to facilitate movement of the machine around the site, and special tables are placed on either side of the mould, one to provide a continuous supply of earth and the other to place the finished blocks on before they are removed for drying.

Operating the CRATerre A.L. Press

Four people are needed to operate the machine, while two to three more are required for excavation and preparation of the earth, which is continuously loaded onto the sloped table, ready for moulding.

A worker standing in front of the press scrapes the soil from the table into the mould, The lid, which is held open by means of counterweights at the back, is pulled down forcefully to pre-compact the soil. Two workers are necessary to push down the lever arm to compress the soil sufficiently, after which the lid is unclamped and allowed to open. By pushing the lever arm further down, the block is ejected and placed aside by the worker in front of the press. While another

worker takes away the block for drying, the mould is filled again without delay, to repeat the production cycle in quick succession.



FIGURE

Technical Details

Size of machine (length x width x height)		230 x280 x 124 cm (90 x 110 x 49 in)
Weight of machine		280 kg
Size and weight of packed machine		not applicable
Standard block size (double mould), each	a.	28 x 12.8 x 8 cm (11 x 5 x 3.2 in)
Standard block size (single mould)	b.	28 x 28 x 8 cm (11 x 11 x 3.2 in)
Maximum nominal compaction force		16 tonnes
Nominal compaction pressure		2 N/mm² (290 p.s.i.)

Compression ratio		1.67: 1
Energy input/transmission		manual/mechanical
No. of blocks per cycle/output rate	a.	2 / 240 blocks per hour
No. of blocks per cycle/output rate	b.	1 / 120 blocks per hour
Labour force required (incl. excavation and mixing)		5 - 7 men
Price		Machine not for sale; produced only for use in projects of CRATerre A.L.

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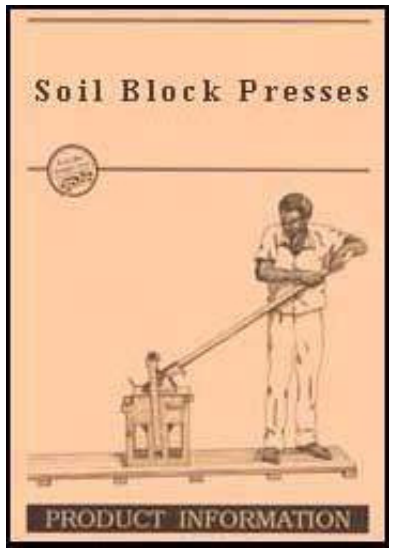

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UNATA 1003 and 1004

Manual Block Presses Produced in Europe 1

Manufacturer
UNATA C.V.
G.V.D. Heuvelstraat 131
B-3140 Ramsel-Herselt
Belgium
Tel. 16 56 10 22
Fax. 16 56 20 25
Tlx. 21 874 ppr b

Description

The UNATA 1003 and 1004 are modified versions of the CINVA-Ram, produced by UNATA (Union for Appropriated Technological Assistance), a small cooperative, established in 1979 and dedicated to the development of simple machines and dissemination of know-how for application in developing countries. The original UNATA Block Press was 1000, hence every increase in the model number indicates a modification or improvement of the previous model, based on research and evaluation of experiences in the field.

The UNATA 1003 is made of higher quality material for the axles and sleeves, increasing its durability to 3 times that of the UNATA 1002. The latch that previously had to be locked and unlocked during each production cycle, has been

replaced by a lever that just has to be pushed back and forth for compression and ejection of the block.

The UNATA 1004 is made of the same materials as the UNATA 1003, but the lever operations for compression and ejection are only on one side of the machine. The mould cover is held by a latch and pulled off the top with the lever arm, providing unobstructed access to the mould during filling and removal of the block. The height of the mould was also increased to reduce the physical strain on the workers. By these modifications, a much higher output rate is achieved.

Operating the UNATA 1003

The operation sequence is the same as with the CINVA-Ram, except that the lever arm and yoke are not locked together with a latch. When the lever arm is pulled back to the position for filling the mould or ejecting the block, it pulls the yoke with it. A lever at the side of the yoke is used to return the yoke on top of the mould cover, ready for the compression phase.

Operating the UNATA 1004

This machine has the mould cover attached to the lever arm, so that pulling back the lever and opening the mould constitute a single operation. For this, the yoke is fixed to the lever arm with a latch, which is released after the mould is covered, so that the lever arm can be pushed down to compress the block.

Technical Details

Size of UNATA 1003 (length x width x height)	44 x 26 x 71 cm (18 x 11 x 28 in)

Size of UNATA 1004 (length x width x height)	42 x 24 x 89 cm (17 x 10 x 35 in)
Weight of UNATA 1003 / 1004	78/86 kg
Size of crate for shipment of UNATA 1003 or 1004	95 x 49 x 31 cm (38 x 20 x 13 in)
Weight of packed machine: 1003 / 1004	100/ 108 kg
Standard block size (single mould)	29 x 14 x 9 cm (11.4 x 5.5 x 3.5 in)
Maximum nominal compaction force	10 tonnes
Nominal compaction pressure	2.4 N/mm² (348 p.s.i.)
Compression ratio: 1003/ 1104	1.7: 1/ 1.8: 1
Energy input/transmission	manual/mechanical
No. of blocks per cycle/output rate: 1003	1 / 70 blocks per hour
No. of blocks per cycle/output rate: 1004	1 / 100 blocks per hour
Labour force required (incl. excavation and mixing)	5 men

Price (ex works)	UNATA 1003	18000 FB	(approx. 500 US$)
valid January 1988	UNATA 1004	20000 FB	(approx. 550 US$)
	Tools	900 FB	(approx. 25 US$)
FB = Belgian Francs	Sieve	600 FB	(approx. 17 US$)
	Packing	2000 FB	(approx. 55 US$)