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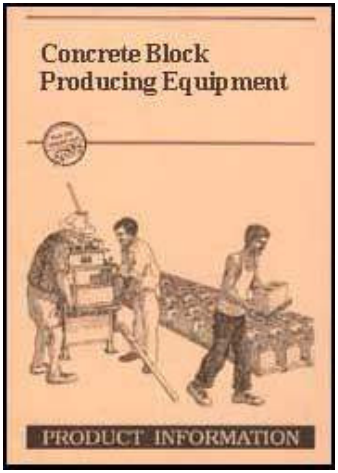

Concrete Block Producing Equipment (GTZ, 1991, 22 p.)

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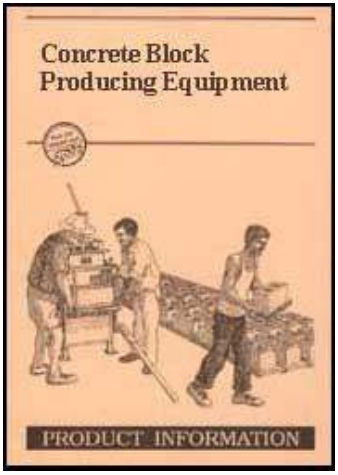

A Publication of the Deutsches Zentrum fr Entwicklungstechnologien - GATE, a Division of the Deutsche Gesellschaft fr Technische Zusammenarbeit (GTZ) GmbH - 1991

NOTE 1: The technical details were provided by the producers. GATE is not in a position to verify these data and therefore cannot accept responsibility 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 1991.

NOTE 2: from the cd-rom library editors: if you perform a search on "concrete block" in other sections or documents in this cd-rom, you will find articles, books or information that may usefully complement or update the information contained herein.


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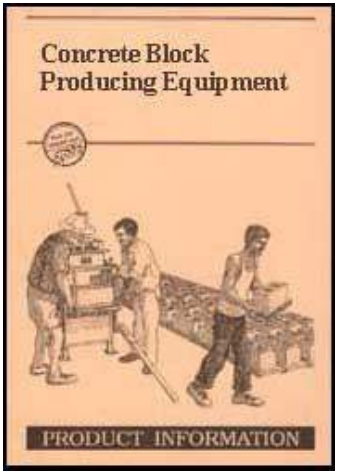
Concrete Block Producing Equipment (GTZ, 1991, 22 p.)



Jesson Lightning static brick/paver/block machine

Description

The Lightning Static Machine is an all-steel stationary unit capable of making a variety of concrete bricks, pavers and blorks at a high output rate. Several interchangeable moulds are available and special moulds can be made to order.

The main features are:

· 800 to 1000 drops per 8 hour day, producing up to 12000 bricks, 10000 pavers or 3000 blocks per day.

· No concrete slab needed - product made on pallets (pallet size

60 x 51 cm; recommended board thickness 19 or 21 mm).

· 220 or 380 volt electric vibration - high frequency.

· Fully protective electrical overload system. · No bronze bushing - vasconite used throughout.

· On-site maintenance avoids any costly "down" time.

· Hydraulic ram operated compactor available on specific request for ultra density needs.

Operating the Lightning Static Machine

A fully instructed, skilled operator and a constant supply of concrete are prerequisites for high production rates with the Lightning Static. But in general the machine is simple to operate.

The mould is lowered onto the wooden pallet and the compactor raised, so that concrete can be filled into the mould. The vibrator is switched on for half a second and the excess concrete is screeded off the mould. The compactor is then lowered onto the

concrete and the vibrator set in motion until the locked nuts on two threaded rods rest on the housing' preventing further compaction.

The mould release handle is pulled down and secured in the lowered position by a sliding bolt, so that the product is released from the machine. A new pallet is inserted and pushed onto the vibration table, as a result of which the loaded pallet is pushed out of the machine. The freshly moulded products are carried away on their pallet to the curing place, while the mould is lowered onto the new pallet and the process repeated.

In case of a power cut due to electric overload, the red button should be pressed after 5 minutes to reset the machine. If the overload does not reset, an electrician should be called.

The principle maintenance requirements are:

· thorough cleaning of the machine and moulds after daily use, because concrete deposits corrode;

· lubricating all moving parts with thin, clean oil - never grease;

· replacing vasconite bushes when worn, in order to protect the steel shafts

· protecting electrical components from getting wet;

· dipping pallets in used motor oil every 4 months to prolong their service life.

Technical Details	Lightning Static Machine	
Size of machine (length x width x height)	150 x 110 x 210 cm (59 x 43 x 83 in)	
Weight of machine (without mould)	550 kg	
(with mould)	700 kg	
Size of crate for shipment (palleted)	1	100 x 80 x 160 cm (39 x 31 x 63 in)
	2	100 x 80 x 90cm(39x31x35in)
Weight of packed machin	1 +	750 kg

Weight of packed machin	1 + 2	750 kg
Standard brick sizes (I x w x h)	a.	22 x 10.5 x 7.5 cm (8.7 x 4.1 x 3 in)
	b	19x9x9cm (7.5x3.5x3.5 in)
Standard block sizes	c	44 x 22 x 22 cm (17.3 x 8.7 x 8.7 in)
	d	44xl5x22cm(17.3x5.9x8.7in)
	e	44x 10.4x22cm(17.3x4.1x8.7 in)
Bevelled pavers (rect./interlocking)	f.	20 x 10 cm (7.9 x 3.9 in) x any thickness
Energy input	electrical (220 or 380 V)	
No. of bricks per cycle/output rate (a, b)	12/1500 bricks per hour	
No. of blocks per cycle / output rate (c, d, e)	2 - 4 / 350 blocks per hour	
No. of pavers per cycle / output	10 rect. or 8 interlocking / 1200	

rate (f)	pavers per hour
Labour force required	8 men

(1 operating machine, 4 removing loaded/resuming empty pallets, 3 loading/operating mixer)		
Price (ex works)	Lightning Static (incl mould/compactor)	
valid June 1991	with hydraulic compaction	15750 R (≈ 5950 US$)
R = South African Rand	without hydraulic compaction	11000 R (≈ 4000 US$)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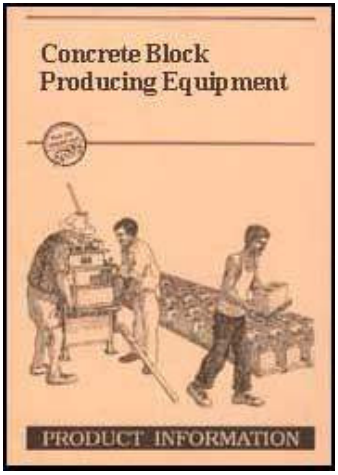

Jesson static junior MK 2 paver/brick machine

Description

The Static Junior MK 2 Machine is an all-steel construction, designed to produce smaller sized concrete building components, such as pavers and bricks, for which the moulds can be interchanged. During each production cycle, six rectangular or interlocking pavers (20 x 10 cm x any thichness up to 14 cm) or eight bricks of 22x 10.4x7.5cm or 19x9x9cm are moulded on a wooden pallet. Special moulds can be made to order.

The machine, which is operated in a stationary position, but has two wheels to move around the brickyard, is powered by a 1.1 kW electric motor, running on single or 3-phase electricity (220 or 380 volts).

Operating the Static Junior MK 2

The Static Junior MK 2 is operated principally in the same way as the Lightning Static, except that the latter is also able to make hollow blocks, has a higher output rate for its bricks and pavers and is not equipped with wheels for moving around the brickyard, as in the case of the Static Junior.

With the compactor raised, the moulds are filled with concrete, vibrated for 1 second, the mould refilled and the excess material smoothed off level with the mould top. The compactor is pulled over the mould and released by turning a handle. After vibrating for about 5 seconds, the mould box handle is pulled down fully and the compactor handle reengaged, releasing the newly made products from the mould. A new pallet is inserted by pushing the loaded pallet out of the machine. While it is being carried away for curing, the mould box is lowered onto the new pallet and the production cycle repeated.

300 Litre Trough Mixer

The family of Jesson machines includes a trough mixer, which is capable of mixing wet, slurry concrete, as well as liquid and granular like chemicals, paints, fertilizers etc. The mixer, which was originally designed for use in the brickmaking industry, has a horizontal shaft around which the mixing paddles rotate. The mix is discharged by gravity through a door at the bottom of the trough, so that a wheelbarrow placed below can be easily filled.

Technical Details	**Static Junior MK 2 Paver/Brick Machine**	
Size of machine (length x width x height)	190 x 110 x 100 cm (75 x 43 x 39 m)	
Weight of machine	190 kg	
Size of carton for shipment	200x 120 x 110 cm (79 x 47 x 43 m)	
Weight of packed machine	220 kg	
Standard brick size (I x w x h)	a.	22x 10.4 x 7.5 cm (8.7 x 4.1 x 3 in)
	b.	19x9x9cm(7.5x3.5x3.5in)

	c.	20 x 10 x any thickness up to 14 cm
Bevelled pavers (rectangular or interlocking)	(7.9 x 3.9 x up to 5.5 m)	
Energy input	electrical 1.1 kW (220 or 380 V)	
No. of bricks per cycle / output rate (a, b)	8 / 900 bricks per hour	
No. of pavers per cycle / output rate (c)	6 / 750 pavers per hour	
Labour force required	5 men	
(1 worker operating the machine, 2 loading pallets and resuming empty ones, 2 operating the mixer)		

Price (ex works) valid June 1991 R = South African Rand	Static Junior MK 2 (incl. I mould, but price can vary either way, depending on mould)	8550 R (= 3000 US$)


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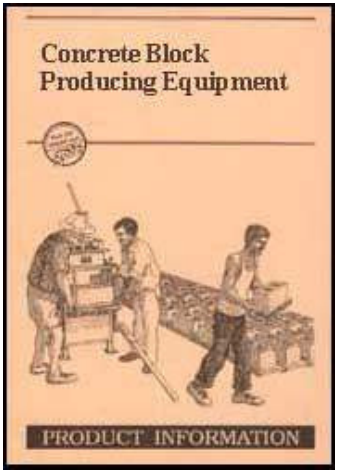

- **Concrete Block Producing Equipment (GTZ, 1991, 22 p.)**
  - ***(introduction...)***
  - **Acknowledgements**
  - **Technology**
  - **Equipment**
  - **Criteria for selection and purchase**
  - **Checklist for potential buyers**
  - **Parry/ITW multivibe blockmaking plant**
  - **ELLSON Vibro concrete block machine**
  - **ELLSON combination plain and hollow concrete block machine**
  - **Jesson Lightning static brick/paver/block machine**
  - **Jesson static junior MK 2 paver/brick machine**

Jesson Lightning II MK 2 / Lightning IV brick/block makers

Description

The Lightning II MK2 and Lightning IV Brick/ Block Makers are all-steel constructions, which function as "egg-laying" machines capable of making a variety of concrete bricks and blocks at a high output rate. Several interchangeable moulds are available and special moulds can be made to order.

The Lightning II MK 2 is fully manual, but can be fitted with

electric vibration, if required, while the Lightning IV is electrically operated, but can also be supplied with a petrol engine. A unique feature of the Lightning II MK 2 is a mechanical size assessment stop, which prevents odd-sized products being made.

Operating the Lightning II/IV Machines

For brick or block production a smooth, level 10 cm thick concrete slab is needed, large enough to accommodate 1.5 days output, that is about 300 m² for the Lightning II MK 2 and about 750 m² for the Lightning IV.

Both machines have a concrete bin, from which the moulds are filled. The concrete is tamped up to a predetermined height and, leaving the compactor down, the mould is lifted off the bricks/ blocks and the machine rolled back to the next drop point, where the mould is lowered, the compactor raised and the cycle repeated. After 24-36 hours moist curing, the products are stacked and kept wet for 7-10 days, then dried.

Technical Details	Lightning II MK 2	Lightning IV

Technical Details		Lightning 11 MK 2	Lightning IV
Size of machine (length x width x height)		140 x 110 x 140 cm (55 x 43 x 55 in)	230 x 150 x 130 cm (91 x 59 x 51 in)
Weight of machine		90 kg	650 kg
Size of crate for shipment (palleted)		150 x 120 x 150 cm (59 x 47 x 59 in)	240 x 160 x 140 cm (94 x 63 x 55 in)
Weight of packed machine		100 kg	700 kg
Brick and block sizes (same for both machines)		Imperial dimensions	Metric dimensions
Standard brick sizes (1 x w x h)	a	22 x 10.4 x 7.5 cm (8.7 x 4.1 x 3 in)	19 x 9 x 9 cm (7.5 x 3.5 x 3.5 in)
Standard hollow or solid block sizes	b	44 x 22 x 22 cm (17.3 x 8.7 x 8.7 in)	39 x 19 x 19 cm (15.4 x 7.5 x 7.5 in)
	c	44x 15x22cm(17.3x5.9x8.7	39x 14x 19cm(15.4x5.5

		in)	x7.5 in)
	d	44 x 10.4 x 22 cm (17.3 x 4.1 x 8.7 in)	39 x 9 x 19 cm (15.4 x 3.5 x 7.5 in)
Energy input		manual	electric motor (1or 3-phase) / petrol engine
No. of bricks per cycle / output rate	a	12 /650 bricks per hour	28 (on side) / 1500 bricks per hour
No. of blocks per cycle / output rate	b	2 / 80 blocks per hour	4 / 375 blocks per hour
	c	3 / 90 blocks pet hour	5 / 375 blocks per hour
	d	4/ 100 blocks per hour	7 / 375 blocks per hour
Labour force required		1 machine operator + 3 helpers	1 machine operator + 5 helpers

Price (ex works)	Lightning II MK 2 1650 R	Lightning IV 9500 R (≈

valid June 1991 R = South African Rand	(≈ 600 US$)	3500 US$)
	(incl. 1 mould/compactor unit; other moulds cost more or less, depending on the type and size)	

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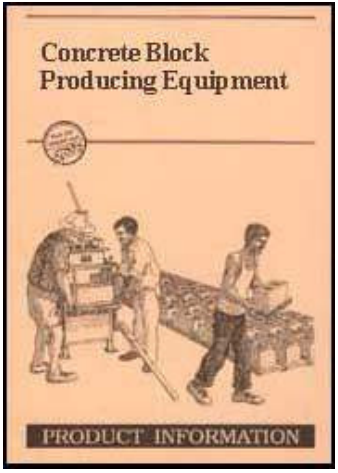

Concrete Block Producing Equipment (GTZ, 1991, 22 p.)

- ***(introduction...)***
- **Acknowledgements**
- **Technology**
- **Equipment**
- **Criteria for selection and purchase**
- **Checklist for potential buyers**
- **Parry/ITW multivibe blockmaking plant**

BlocMatic 4 series blockmaking machines

Manufacturer
L.B. Engineering
Express Works, Luke Lane,
Brailsford, Derby DE6 3BY
United Kingdom
Tel. [. . 44] 335 - 60573
Tlx. 377494 mklein
Fax. [. . 44] 335 - 60225

Description

The BlocMatic is an egg-laying type blockmaking machine, which is available in three versions:

- **BlocMatic 4E Electric (3 Ph., 440 V, SO cps)**
- **BlocMatic 4P Petrol Engine Driven**
- **BlocMatic 4D Diesel Engine Driven**

A manual gear unit can also be provided for remote locations, where no suitable energy supply is available.

The BlocMatic was designed to manufacture blocks, bricks, pipes, etc, from concrete or other compactable materials. A wide range of moulds for standard size products are available, but special shapes and sizes can be made on request.

The machine, moulds and tamper units, etc, arc designed and manufactured to withstand rough use over long periods. Since the BlocMatic is very simple to operate, no skilled labour is required. The unique demoulding assistance system and swing out compaction head minimize operator fatigue and ensure consistently high rates of production.

Some Special Features of the BlocMatic

· A demoulding and resetting assistance device, which helps the operator strip the product from the mould, reducing the effort by 80 %;

· automatic tamper lock down device, which ensures positive stripping, indicates when the block is at the precise height required and then allows the tamper to be lifted by the mould to

the reset position for filling;

· swing-out tamper head, which allows the mould to be filled easily and the head to be swung back quickly with minimum operator movement and loss of time;

· quick change mould assembly, making mould changes quick and easy, just by removing two nuts;

· automatic braking and positioning, ensuring that the machine moves exactly the correct distance to set down the next set of blocks, after which a locating device operates making the machine immobile (although this device can be overridden, so that the machine can be turned or moved when not in production);

· high skirt plates all around mould filling area, to permit rapid filling without sillage on casting area or product already made (therefore more speed, no waste and better blocks);

· single screw block height adjustment, for rapid height

adjustment, while the tamper remains level without the need for the usual four adjustments;

· Iarge diameter, heavy duty wheels, with ball bearings for easy machine movement and long life. Powered traction also available on the 4E.

Operating the BlocMatic

1. The machine is positioned on a smooth level concrete surface, at the spot where the blocks are to be cast. The concrete mix is tipped over the mould tray area and raked over the mould approximately 50 mm deep.

2. The foot pedal is briefly pressed to give a short burst of vibration, which fills the mould The concrete is raked off level with the mould top and the surplus drawn back onto the tray.

3. The tamper is swung over the mould, the vibrator switched on by pressing the foot pedal and the tamper

released with the drop lever.

4. When the tamper lock drops in over the block height adjuster, the block is formed. The vibration must then continue for a few seconds to release the tamper faces.

5. The foot pedal is released to stop the vibration and the main lever turned to eject the blocks onto the floor. The turning has to be continued until the tamper latches are in the raised position.

6. Finally, the brake release pedal is pressed and the machine rolled to the next casting area, whereby the machine stops automatically and locks itself in the correct position. The mould is lowered again and the tamper swung out, so that the production cycle can be repeated as described above.

Other BlocMatic Equipment

A pick-up truck (to carry one drop of blocks a a time) enables the

casting area to be cleared quickly and with very little effort, without the need to lift the blocks by hand.

Powered feed trucks (barrows) are also avail able to take the concrete mix from the mixer to the machine.

Technical Details		**BlocMatic 4E, 4P, 4D**
Size of machine (length x width x height)		220 x.125 x 137 cm (87 x 49 x 54 in)
Weight of machine (without mould or tamper)		4E = 503; 4P = 505; 4D = 534 kg
Weight of mould and tamper unit (average)		104 kg
Size of crate for shipment		152 x 152 x 244 cm (60 x 60 x 96 in)
Weight of packed machine (incl. 3 moulds/tampers, a pick-op truck and spares)		1150 kg
Standard block sizes (L x w x h)	a	(hollow) 40 x 20 x

Standard block sizes (l x w x h)	a.	(hollow) 40 x 20 x 20 cm (16 x 8 x 8 in)
	b.	(kollow) 40 x 10 x 20 cm (16 x 4 x 8 in)
	c.	(solid) 40 x 10 x 20 cm (16 x 4 x 8 in)
Energy input / transmission		motorized or manual operation / mechanical
No. of blocks per cycle/output rate	a.	3 / 180 blocks per hour
	b.	6 /360 blocks per hour
	c.	6 / 360 blocks per hour
Labour force required		3 men
Price (ex works) valid June 1991	BlocMatic 4E	2919 £ Sterling (≈5

	(Electric)	100 US$)
	BlocMatic 4P (Petrol)	3 045 £ Sterling (≈5 330 US$)
	BlocMatic 4D (Diesel)	3 254 £ Sterling (≈ 5 700 US$)
	Mould for block size a	580 £ Sterling (≈ I 020 US$)
	Mould for block size b	755 £ Sterling (≈1320 US$)
	Mould for block size c	520 £ Sterling (≈ 9 10 US$)
	Pick-up truck	331 £ Sterling (≈ 580 US$)
	Packing case + FOB approx.	450 £ Sterling(≈ 790 US$)


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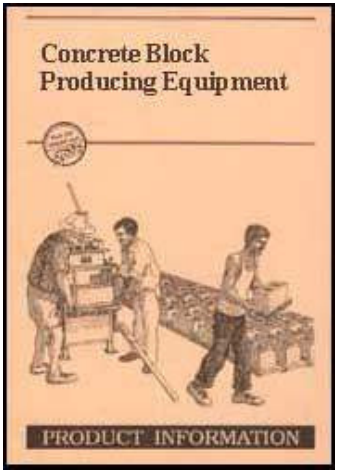


Multibloc 5, 8, 12

Mobile Blockmaking Machines

Manufacturer
Multibloc Limited
Blackswarth Road
Bristol BS5 8AX
United Kingdom
Tel. [. . 44] 272 - 55 19 51
Tlx. 44716

Fax. [. . 44] 272 - 55 08 62

Description

The Multibloc 5, 8, 12 mobile blockmaking machines are compact low level machines. They are easy to operate by one man, producing blocks on the floor, thus eliminating pallets and reducing breakage of blocks, ensuring high production efficiency. The machines have few moving parts and are easily maintained. Mouldbox and tampers are quickly interchangeable, enabling a wide range of different blocks to be produced.

The machines can be operated by electric motor, diesel or petrol.. Electrically the supply requirement would be either 380 volts, 3 phase 50 cycle or 220 volt, I phase 50 cycle. Alternative supplies require special consideration. Traction is offered as an option on electric models if required

Technical Details	Multibloc 5	Multibloc 8	Multibloc 12
Size of machine (I x w x h)	210 x 135 x	210 x 165 x	210 x 185 x

	184 cm	184 cm	184 cm
Weight of machine	710 kg	1080 kg .	1650 kg
Size of crate for shipping	220x 150x 120cm	220x 180x 120 cm	220x200x 120cm
Weight of packed machine	880 kg	1160 kg	1740 kg
Standard block size [a]	40 x 20 x 20 cm	40 x 20 x 20 cm	40 x 20 x 20 cm
Other block widths (1x h-same as above) [b end c]	15 and 10 cm	15 and 10cm	15 and10cm

Drive	For all machines: Electric 380 volts, 3 phase 50 Hz [i], or Electric 220 volts, 1 phase 50 Hz [ii], or Diesel Petters AAI [iii]
Vibration	All belt drive:[i] 1 BHP motor,Intermittent run; [ii] 1.5 BHP motor,Continuous run; [iii] 3 BHP engine, Continuous run
Traction	Offered as an option on Electric models: [i, ii] 0.25 BHP Motor gearbox unit; [iii] Not available

Output	No of blocks per cycle [a, b, c]	2,3, 5	4,5,8	6,8,12

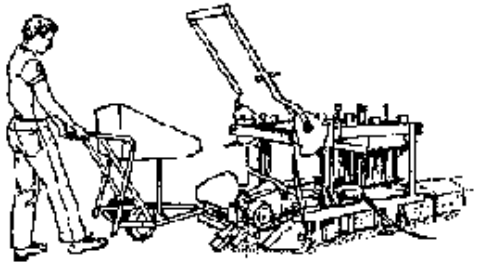
	No of blocks per hour [a, b, c]	60, 90, 150	120, 150, 240	180, 240,360
Labour force required (incl. mixing and filling concrete)		3 men	4 men	5 men

Price (ex works)	Electric	2458 £ Sterling (≈4300 US$)	2671 £ Sterling (≈ 4680 US$)	4168 £ Sterling (≈7300US$)
	Diesel	3470 £ Sterling (≈ 6100 US$)	3825 £ Sterling (≈ 7000 US$)	4438 £ Sterling (≈ 7770 US$)
valid	Set of 3 moulds	3056 £ Sterling (≈ 5350 US$)	5 176 £ Sterling (≈ 9060 US$)	6427 £ Sterling (≈1 1250 US$)
June 1991	Spares package	570 £ Sterling (≈1000 US$)	655 £ Sterling (≈ 1150 US$)	655 £ Sterling (≈1 1 50 US$)
	FOB expenses	299 £ Sterling (≈530 US$)	377 £ Sterling (≈590US$)	426 £ Sterling (≈750US$)

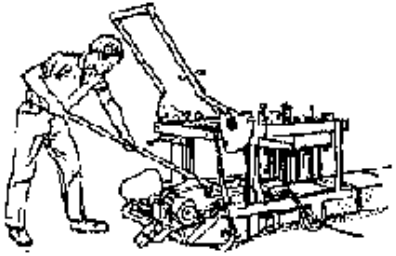
Operating the Multibloc machines

Multibloc machines are designed so that they can be teamed up

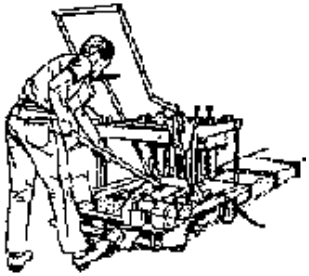
with feeding and handling machines to give a smooth totally integrated operation that saves time and money. For the Multibloc 5 it is best to use a Feed Barrow and Hand Lift Truck, while the Multibloc 8 and 12 are best combined with the Power Feed Truck and Hand Lift Truck.



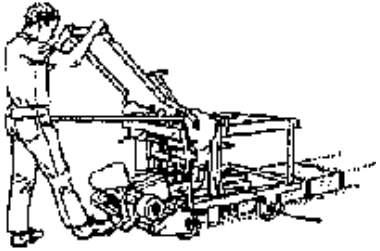
The mixed concrete is tipped into the feed tray using a hand barrow or power feed truck.



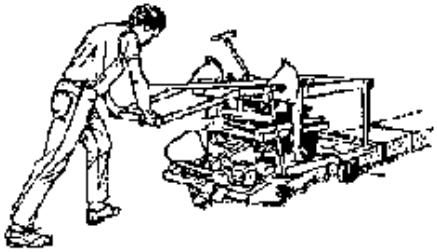
The concrete is raked into the mouldbox area until it is 4-5 cm (1.5 - 2 in) above the level of the mould.



The mouldbox is vibrated by pushing down the foot switch for a few seconds. Pre-vibration time varies according to block disign and type of materials used. The hand rake is used to ensure even distribution in the mouldbox ,raking surplus material onto the feed tray.



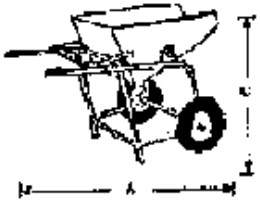
The tamper is pulled over the mould, with the rake and the catch released, dropping the tamper onto the concrete in the mouldbox. Vibration is repeated until the tamper comes down to the height stop tubes.



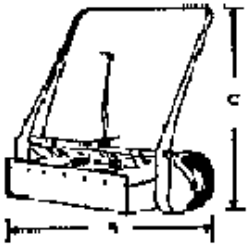
To eject the blocks, the handle is pulled down until the tamper catch engages, lifting the mould clear of the blocks. The machine is then pulled forward the required distance and the operation repeated for the next cycle of blocks.

Ancillary Equipment

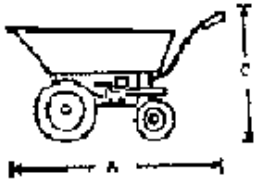
APPROXIMATE SHIPPING SPECIFICATIONS



FEED BARROW
A = Overall Length .....120 cm.
B = Overall Width .....61 cm.
C = Overall Height .....90 cm.
Unladen Weight .....51 kg.
Can be packed with machine at no extra packing or freight charge.



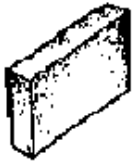
HAND LIFT TRUCK
A = Length .....143 cm.
B = Width .....61 cm.
C = Height .....153 cm.
Unladen Weight .....105 kg.
One case 152 x 69 x 69 cm.
Gross weight 165kg.



FEED BARROW
A = Overall Length .....190 cm.
B = Overall Width .....72 cm.
C = Overall Height .....114 cm.
Unladen Weight .....220 kg.
One case 200 x 90 x 130 cm gross.
Gross weight 324kg

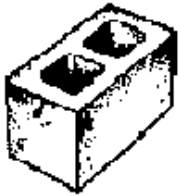
Typical Block Designs

400 x 200 x 100
4 Through cavity plain ends.



400 x 200 x 100
Solid plain ends.

520 x 229 x 140mm.
Solid Omni.



400 x 200 x 200 mm
Through cavity plain end.

520 x 238 x 100mm
2 Through cavity
Omnia flooring
Block.

4¼" x 8" x 2" brick.
AV. 26/44/64 per gross on end.
AV. 17/22/32 per gross on side.

FIGURE

Other Multibloc Machinery for Concrete Blockmaking

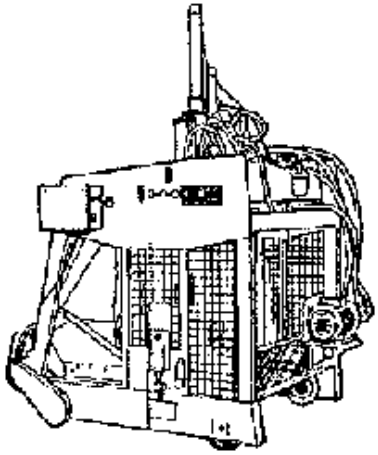
Multibloc looks back on 40 years of experience in the production of machines for concrete blockmaking, which are being used in more than 100 countries throughout the world. In addition to the three machines described in this leaflet, Multibloc offers two larger machines: Multibloc 16 and Multibloc 36.

The Multibloc 1 6 is a hydraulically operated block maker, which lays the building blocks on the floor. The machine can be electrically, diesel or petrol driven, and controlled by an operator sitting on an adjustable pivoted seat. The concrete is delivered direct to a sliding feed box, which fills the mouldbox without any physical effort. Since there is no operator fatigue, block production speed i consistently high throughout the day.

The Multibloc 36 is a larger model of the '16' with added facility for increased output A large hopper with hydraulically operate' door reduces the dependence on the feed truck and improves production speed.

A special Multibloc Truck is available for the efficient feeding of concrete to the ma chines and removing of cured products.

Multibloc also produces the BREPAK Bloc Press for making compressed soil block (for details see GATE Product Information: Soil Block Presses).



FIGURE

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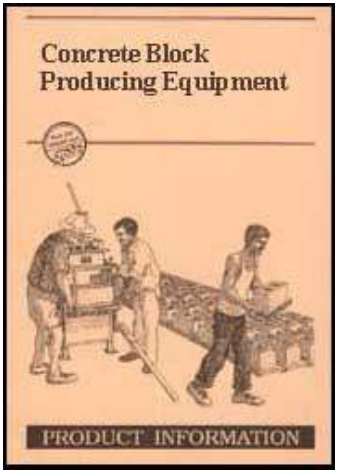


Fleming F - 100 block machine

Manufacturer
Fleming Mfg. Co.
432 Fleming Ave.
Cuba,
Missouri 65453
U.S.A.
Tel. [. .1] 314 - 885-331 1
Fax. [. .1] 314 - 885-4338

Description

The Fleming 100 is a concrete block machine designed for on-site production. It produces either one 8 inch(20 em), two 6 inch (15cm) or three 4 inch (10 cm) building blocks on plain plywood pallets every machine cycle. The machine is easy to operate and requires no special skills.

The moulds are supplied complete with height attachments, allowing blocks of 4, 6 and 8 inch height to be produced with only one mould box. More than 200 mould designs for other popular brick sizes, decorative units, chimney blocks, paving stones, patio slabs, etc, are available to choose from. The changing of moulds is a simple task.

The high frequency vibrator system of the Fleming 100 is powered by a 3 hp electric motor (3-phase, 50-60 Hertz, 220 volt) or a petrol engine. The machine is operated manually and outputs of 100 cycles per hour can be easily achieved with 3 people under normal working conditions.

Other Fleming Equipment and Services

Fleming offers the customer all equipment, knowledge and marketing assistance needed to begin or expand into the concrete building component market. The production scale can be small, medium or large and the operation manual or fully automatic, depending on the market needs.

In addition to a range of versatile machines designed to produce all kinds of concrete components, Fleming manufactures heavy duty plant mixers, elevators, hoppers, stackers, block splitters and other equipment required in concrete plants.

As a full service company, Fleming provides initial plant layout drawings, production costs, technical mix design and an exclusive maintenance programme for the equipment installed.

Operating the Fleming 100

On account of the high output rate, it is necessary to use a large capacity concrete mixer and, as far as possible, a hopper feed

system located directly above the Fleming TOO, so that the moulds can be filled with maximum efficiency. Alternatively, the mould can be filled manually by means of shovels.

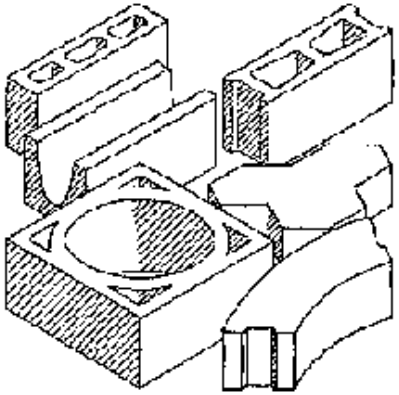
A batching hopper on top of the machine is pulled over the mould before the concrete mix is poured in under vibration. The hopper is pushed back and a wooden or steel pallet is fixed on top of the levelled concrete. By pulling a lever, the mould box is rotated by 180°, such that the pallet is underneath the block.

The stripping lever on the right of the machine is then pulled down completely to strip the block from the mould box. By doing so, the stripper-head rests on the top surface of the block, pushing it down clear of the mould. The freshly moulded block can then be carefully removed to the curing stack, resting on its pallet.

The mould box is lowered and rotated into its starting position, so that the batching hopper can be pulled over it and the mould filled again to repeat the cycle as before.

The Fleming Manufacturing Co., Inc.

The production of concrete machinery began in the early 1940s, when Harry Fleming developed the first block machine, which he called the Fleming 100, as it was capable of producing 100 blocks an hour. Shortly afterwards, various larger block machines and other equipment were devoloped, so that complete block plants could be offered. Fleming has now become a leading supplier of machinery for the manufacture of landscape products and interlocking street pavers. Fleming machines have been supplied to 54 countries all around the world.



Some typical Fleming 100 concrete products

Technical Details		Fleming F - 100 Block Machine
Size of machine (length x width x height)		122 x 122 x 152 cm (48 x 48 x 60 in)
Weight of machine (incl. motor and 1 comb. mould for 3 block types)		680 kg
Size of crate for shipment		127 x 127 x 157 cm (50 x 50 x 62 in)
Weight of packed machine		900 kg
Standard block sizes (1x w x h)	a.	40 x 20x 20 cm (16x 8 x 8 in)
	b.	40x20x 15cm(16x8x6in)
	c.	40x20x 10cm (16x 8x4in)
Energy input /transmission		electric motor or petrol

No. of blocks per cycle/output rate	a.	engine / mechanical 1/100 blocks per hour
	b.	2/200 blocks per hour
	c.	3/300 blocks per hour
Labour force required (incl. mixing, carrying away blocks, etc)		3 men
Price (ex works)	Fleming 100	17 690 US$
valid June 1991	Mould with stretcher	6 775 US$

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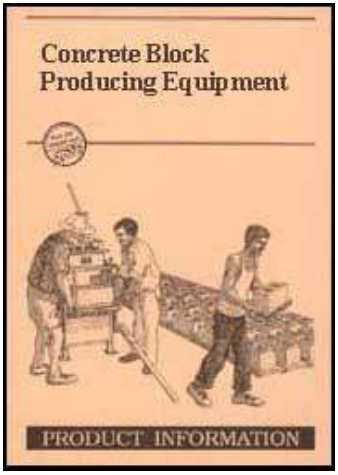
Concrete Block Producing Equipment (GTZ, 1991, 22 p.)

(introduction...)

Acknowledgements



- **Technology**
- **Equipment**
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- **Parry/ITW multivibe blockmaking plant**
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- **Jesson static junior MK 2 paver/brick machine**
- **Jesson Lightning II MK 2 / Lightning IV brick/block makers**
- **BlocMatic 4 series blockmaking machines**

- **Multibloc 5, 8, 12**
- **Fleming F - 100 block machine**

M. E.V. BM 636 F blockmaking machine

Manufacturer
M.E.V. GmbH
Gottlieb-Daimler-Str. 19
D - 6900 Heidelberg
Federal Republic of Germany
Tel. [. .49] 6221 - 162626 + 162961
Tlx. 461353
Fax. [. . 49] 6221 - 21105

Description

The BM 636 F is a static blockmaking machine, designed for the small and medium scale production of concrete elements (solid and hollow blocks and bricks, pavers, kerbstones, screen blocks, etc) of a large variety of shapes and sizes, the maximum and

minimum block heights being 20 and 6 cm respectively.

It is a compact machine, which, compared to its high output rate, requires a relatively small floor space of 1.7 m².

A special feature of the machine, which is normally equipped with a 2 kW electric motor (220/380 V, 3 phase, 50 cycles) underneath the vibrating table (giving up to 750 kg of centrifugal force), is that it can also be operated manually (mechanically). Alternatively, the machine can be supplied with a diesel engine. The operation of the machine is easy to learn and requires no special skills.

Operating the BM 636 F

At the start of each production cycle, a wooden pallet (60 x 36 cm) is placed on the vibrating table and the mould box is lowered onto it.

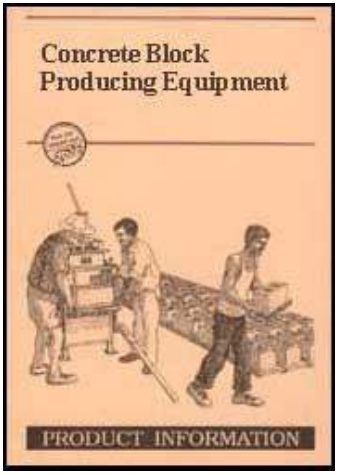
Concrete is fed manually into the feed drawer and mould box. After releasing the press-head, the vibration and compaction of

the blocks is started by push button control. As soon as the blocks have the correct height, the vibration stops and the block is demoulded. Through a pallet ejector, the pallet with the green blocks is pushed out of the machine so that it can be taken off comfortably.

The pallets with the green blocks can be stacked for curing side by side and also up to 4 layers, so that only a small area for curing and stacking is required.

Technical Details		**M.E.V. BM 636 F**
Size of machine (length x width x height)		131 x 132.5 x 245 cm (52x 52 x 96 in)
Weight of machine		850 kg
Size of crate for shipment		approx. 4.5 m³
Weight of packed machine		980 kg
Pallet size		60 x 36 cm (24 x 14 in)
Production area on pallet		50 x 30 cm (20 x 12 in)
Moulds for standard blocks (l x w	a	1 block, 40 x 20 x 20 cm

Moulds for standard blocks (l x w x h)	a.	1 block, 40 x 20 x 20 cm (16 x 8 x 8 in)
(Any other moulds	b.	2 blocks, each 40 x 15 x 20 cm (16 x 6 x 8 in).
can be supplied on request)	c.	3 blocks, each 40 x 10 x 20 cm (16 x 4 x 8 in)
Energy input		electric motor, diesel engine or manual operation
Production speed		1.5 - 2 cycles per minute
Manpower required (incl. mixing, carrying away blocks, etc)	2 - 3 men	
Price (ex works)	M.E.V. BM 636 F	27 950 DM (≈16 450 US$)
valid June 1991	(single version)	DM = Deutsche Mark

M. E. V. BM 646 F blockmaking machine

Description

The BM 646 F is a static blockmaking machine, similar to the BM 636 F, but was designed for higher outputs and medium scale production of concrete elements (solid and hollow blocks and bricks, pavers, kerbstones, screen blocks, etc) of a large variety of shapes and sizes, the maximum and minimum block heights being 25 and 6 cm respectively. Also the pallet size of 60 x 46 cm is larger than that of the BM 636 F, allowing for more blocks to be made per cycle.

The external dimensions of the 646 F are the same as those of the 636 F but the former has a 0.3 m³ capacity hopper fixed above the feed drawer, making the filling of the moulds more efficient. A 2.5 kW electric motor (220/380 V, 3 phase, 50 cycles) underneath the vibrating table gives up to 1000 kg of centrifugal force for the compaction of the concrete products.

Operating the BM 646 F

The BM 646 F is operated in much the same way as the BM 636 P. However, on account of the higher output rate, considerably more concrete is required per hour, hence an overhead rail skip or a wheeled dumper is needed to keep the hopper filled.

All operations are semi-automatic, controlled by the operator with the help of levers and buttons. The removal of pallets with the newly cast green blocks is done manually, but M.E.V. can also supply mechanical or other system to suit a customer's requirements.

Other M.E.V. Equipment

Apart from the BM 636, 646 and larger static blockmaking machines as well as the BSF 500 egg-laying type machine (shown overleaf) M.E.V. produces a Mobile Blockmaking Machine, SF 1033, which is also an egg-laying type machine, requiring no pallets, but a large concrete production yard of at least 400 m². The machine has two strong vibrator units, giving a max. centrifugal force of up to 2200 kg. With an average working speed of 1 cycle per min. and, for example, 6 blocks (40 x 15 x 20 cm) per cycle, it can produce 360 blocks per hour.

Technical Details		**M.E.V. BM 646 F**
Size of machine (length x width x height)		131 x 132.5 x 245 em (52 x 52 x 96 m)
Weight of machine		1130 kg
Size of crate for shipment		approx. 5 m³
Weight of packed machine		1200 kg
Pallet size		60 x46 cm (24 × 18 in)
Production area on pallet		50 x 40 cm (20 x 16 in)
Moulds for standard blocks (I x w	a.	2 blocks, each 40x 20 x 20

x h)		em (16 x 8 x 8 in)
(Any other moulds	b.	3 blocks, each 40 x 15 x 20 cm (16x 6 x 8 in)
can be supplied on request)	c.	4 blocks, each 40 x 10 x 20 cm (16 x 4 x 8 in)
Energy input		electric motor, diesel engine or manual operation
Production speed		1.5- 2 cycles per minute
Manpower required (incl. mixing, carrying away blocks, etc)		2 - 3 men
Price (ex works)	M.E.V. BM 646 F	28 680 DM (≈ 16 880 US$)
valid June 1991	(single version)	DM = Deutsche Mark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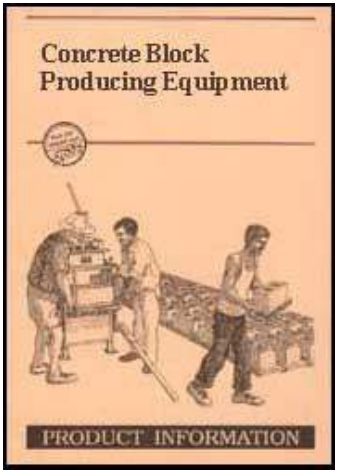


Bibliography

(E) = English

01 Cau, Olof.: How to start a concrete blockyard, Botswana Enterprises Development Unit (BEDU), Gaborone, 1979 (L)

02 Everett, Alan: Materials, Mitchell's Building Series, Batsford Academic and Educational Ltd., London, 1984 (E)

03 McIntosh, J.D.; Kolek, J.: Concrete Mixes for Blocks, Concrete Building and Concrete Products, Vol XL, No 2 (pp 83-97) London, February 1965 (E)

04 McIntosh, J.D.: The Manufacture and Use of Concrete Blocks for Walls, Overseas Building Notes, No 150, Building Research Station, Garston, U.K., June 1973 (E)

05 National Building Research Institute: The manufacture and use of concrete blocks for walling, Information Sheet X/BOW 2-52, NBRI, Pretoria, 1980 (E)

06 Portland Cement Institute: The Manufacture of Concrete Masonry Units, PCI, Johannesburg, 1980 (E)

07 Rai, Mohan; Jaisingh, M.P.: Advances in Building Materials and Construction, Central Building Research Institute, Roorkee, 1986 (E)

08 Regional Network in Asia for Low-Cost Building Materials Technologies and Construction Systems: State of R&D on

LowCost Building Materials & Technologies In Asia, Monograph Series No 2, RENASBMTCS, Manila, 1987 (E)

09 Santi Sridorungkatum; Chalermchai Ngourungsi: Technology Manual on Concrete Hollow Blocks, RENASBMTCS, UNDP/UNIDO, Manila, 1987 (E)

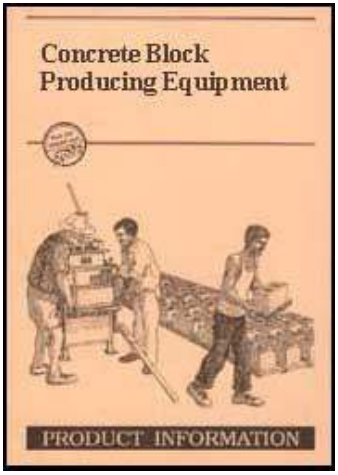
10 Spence, R, J. S.; Cook, D. J.: Building Materials in Developing Countries, John Wiley & Sons, Chicester, 1983 (E)

11 Stewart, F.: Manufacture of Cement Blocks in Kenia, in "Technology and employment in industry" A case study approach, International Labour Office, Geneva, 1981 (E)

12 Stulz, Roland; Mukerji, Kiran: Appropriate Building Materials, A Catalogue of Potential Solutions, SKAT, St. Gall, GATE, Eschbom, IT Publications Ltd., London, 1988 (E)

13 U.S. Department of the Army: Concrete, Masonry and Brickwork, A Practical Handbook for the Home Owner and Small Builder, Dover Publications, Inc., New York, 1975 (E)

Home"" """"> ar.cn.de.en.es.fr.id.it.ph.po.ru.sw



Acknowledgements

German Appropriate Technology Exchange
Dag-Hammarskjld-Weg 1
Postfach 5180
D-6236 Eschborn 1
Federal Republic of Germany
Tel. (06196) 79-0 Tlx. 41523-0 gtz d

GATE - stands for German Appropriate Technology Exchange, founded in 1978 as a special division (Division 4020) of the government-owned Deutsche Gesellschaft fr Technische Zusammenarbeit (GTZ) GmbH (German Agency for Technical Cooperation).

GATE is a centre for the dissemination and promotion of appropriate technologies for developing countries. GATE defines "appropriate technologies" as those which appear particularly apposite in the light of economic, social and cultural criteria. They should contribute to socio-economic development whilst ensuring optimal utilization of resources and minimal detriment to the environment. Depending on the case at hand, a traditional, intermediate or highly developed technology can be the "appropriate" one.

GATE focusses its work on the following areas:

- Technology Dissemination
- Research and Development
- Environmental Protection

GATE offers a free information service in appropriate technologies for all public and private development institutions in countries dealing with the development, adaptation, application and introduction of technologies.

BASIN is a coordinated network of experienced international professionals, set up to provide qualified advice and information in the field of building materials and construction technologies.

The activities of BASIN are divided between four leading European, non-profit appropriate technology organizations, each of which covers a separate specialized subject area, in order to provide more qualified expertise with greater efficiency.

The services offered by BASIN encompass:

· responses to technical enquiries;

· maintenance of a documentation and computer database with. evaluated information on documents, technologies, equipment, institutions, consultants, projects, etc;

· monitoring of practical field experiences;

· preparation of publications to close information gaps;

· organization of training courses, workshops, seminars and exhibition;

· implementation and management of research and development projects.

This Product Information Portfolio was conceived to inform users as objectively as possible about fibre concrete and micro concrete roofing in general, and more specifically about the available equipment, as well as aspects of selecting and buying the most suitable type. 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 inaccurracies. As the prices and exchange rates are subject to change, they are only meant to serve as guidelines.

Text, illustrations, layout: K. Mukerji, H. Worner, SKAT (1991)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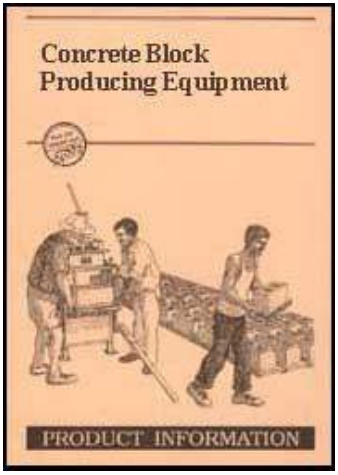

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- **M. E. V. BM 646 F blockmaking machine**

Bibliography

Technology

General

Concrete block construction is gaining importance in developing countries, even in low-cost housing, and has become a valid alternative to fired clay bricks, stabilized soil, stone, timber and other common constructions, providing the ingredients are available locally, are of good quality and economically viable.

The essential ingredients of concrete are cement, aggregate (sand, gravel) and water, but the physical characteristics of the material can be extremely diverse, depending on the type and relative proportions of these ingredients, the addition of other ingredients and components, and also the production method. Concrete is thus a very versatile material and can be made to satisfy a large variety of requirements, whether it is used for foundations, floor slabs monolithic walls cast in situ, or for prefabricating concrete blocks.

Assuming that the ingredients and workmanship are of average quality, the main characteristics of the most common types of concrete are:

· high compressive strength, resistance to weathering, impact and abrasion;
· low tensile strength (but can be overcome with steel reinforcement);
· capability of being moulded into components of any shape and size;
· good fire resistance up to about 400°C.

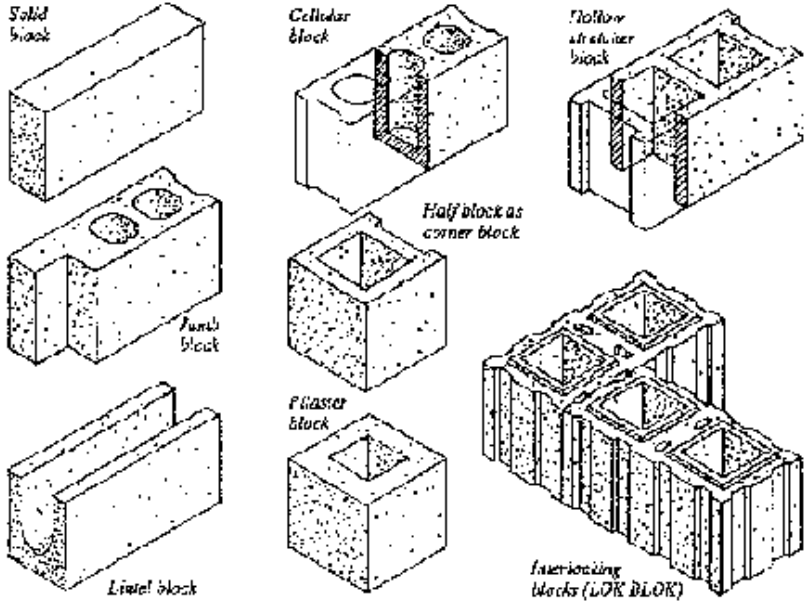
The main problems, particularly with regard to developing countries, are:

· the need for a relatively large amount of cement, which can be expensive and difficult to obtain;
· the need for a relatively large amount of clean water for mixing and curing, which can be a serious problem in dry regions;
· the need for special knowledge and experience in the production process;

· the risk of deterioration through sulphates in the soil or water to which the concrete is exposed.

Entrepreneurs wishing to start the production of concrete blocks will not only have to consider all these technical and economic aspects, but also a number of environmental, social and administrative factors, in comparison to other alternative building materials, before undertaking further steps towards the establishment of a manufacturing plant.

The information on concrete block production presented on this folder should, however, be regarded only as a brief introduction to the technology and criteria for the selection and purchase of equipment. The reader is advised to refer to the Select Bibliography for detailed information.



FIGURE

Types of Concrete Blocks

Concrete blocks are produced in a large variety of shapes and sizes, either solid, cellular or hollow, dense or lightweight, air-cured or steam-cured, loadbearing or non-loadbearing, and can be produced manually or with the help of machines.

· Block sizes are usually referred to by their nominal dimensions, which are the actual block length, width and height plus 10 mm of mortar bed thickness added to each dimension. These are normally based on the modular coordination of design with the 10cm module as its basic unit. The most commonly used concrete blocks are the stretcher blocks with a nominal length of 40 cm (half blocks: 20 cm) nominal height of 20 cm, and nominal widths of 8, 10, 15 and 20 cm. In addition, a wide variety of non-modular blocks and special shapes are available, such as corner, jamb, lintel, pilaster and interlocking blocks, to name only a few.

· Solid blocks have no cavities, or - according to US standards - have voids amounting to not more than 25 % of the gross cross-sectional area. Thinner blocks of less than 75 mm (3") width are essentially solid, because of the difficulty of forming cavities.

· Cellular blocks have one or more voids with one bed [ace closed, and are laid with this 'blind end' upwards, preventing wastage of bedding mortar, which would otherwise drop into the cavities.

· Hollow blocks are the most common types of concrete blocks, having one or more holes that are open at both sides. The total void area can amount to 50 % of the gross cross-sectional area, and - according to British Standards - the external wall thickness must be at least 15 mm or 1.75 x nominal maximum size of aggregate, whichever is greater. The use of concrete hollow blocks has several advantages:

+ they can be made larger than solid blocks, and if lightweight aggregate is used, can be very light, without forfeiting much of their load-bearing capacity;

+ they require far less mortar than solid blocks (because of the cavities and less proportion of joints, due to large size), and construction of walls is easier and quicker;

+ the voids can be filled with steel bars and concrete, achieving high seismic resistance;

+ the air-space provides good thermal insulation, which is of advantage in most climatic regions, except warm-humid zones; if

desirable, the cavities can also be filled with thermal insulation material;

+ the cavities can be used as ducts for electrical installation and plumbing.

· Dense concretes are normal concretes with a density exceeding 2000 kg/m3, while the densities of lightweight concretes can be as low as 160 kg/m'. The former are produced with well graded aggregates (with a large amount of fines to fill all voids) and full compaction, while the latter comprise lightweight aggregates and/ or a high proportion of single-sized particles of coarse aggregate (no-fees concrete) in a lean mix, which is not fully compacted, or comprise a sand-cement mix with a foaming agent to aerate the mixture. Lightweight concrete is generally used for concrete blocks, provided that the ingredients are available and the strengths obtained are acceptable.

. Air curing is the standard procedure for the strength development of concrete, by which the concrete is kept wet for at least 7 days and then allowed to dry at ambient temperature.

**With steam curing, by which the concrete is exposed to low or high pressure steam (in autoclaves),
high early strengths can be achieved (with autoclaving the 28 day strength of air-cured concrete can be obtained in 24 hours). However, in developing countries, steam curing is unlikely to be implemented, because of its high cost and sophistication.**

· The definition of loadbearing and non-loadbearing blocks is fairly complex and depends not only on the compressive strengths of the blocks, but also on the ratio of their height to thickness, their density and proportion of voids.

· Manual block production is the cheapest but most laborious method, and the blocks are not likely to attain the superior qualities that are achieved by the far more expensive mechanized production.

Materials for Concrete Blocks

Since the ingredients of concrete can be of very different types and qualities, not only depending on their local availability, but

also on the desired properties of block, equipment and production method, it is not possible to give detailed recommendations on materials and mix proportions, other than very general guidelines. It is up to the manufacturer to select the most suitable materials and design of mixes by trial and error, and making tests with the available equipment under the conditions of full-scale production.

Cement

· The following cements are commonly used in concrete blockmaking:

Ordinary Portland cement (OPC). cheapest and most common type used.

Rapid hardening Portland cement (RHPC): more finely ground cement, which hardens much faster than OPC. It is especially useful:

- where storage space is limited,

- when rapid production is important, and
- to produce good strength blocks despite poor gradation of aggregate.

Block mix cement: marketed especially for blockmaking, but can vary from one manufacturer to another. It has the high early strength qualities of RHPC, but is lower in price.

Special cements: such as Portland blast furnace cement, sulphate-resisting Portland cement and others, used where special properties are of importance. The partial replacement of cement by apozzolana, eg rice husk ash, fly ash, may be acceptable in certain cases, but should not be implemented without prior laboratory testing.

Aggregates

· In order to facilitate transportation, handling and laying concrete blocks, it is necessary to reduce their density. This is achieved by reducing compaction, ensuring a relatively high proportion of air gaps between the aggregate particles and/or

using lightweight aggregates. Hence it is important to have a relatively high proportion of coarser particles, because too much fine aggregate would fill the gaps and increase the density. However, a carefully measured amount of very fine particles is necessary to produce the cement paste required to bind the coarser particles.

· The maximum particle size of coarser aggregates is 13 mm (or 10 mm for hollow blocks). Rounded stones produce a concrete that flows more easily than angular (broken) particles, but the latter give higher 'green strength' to the newly demoulded block, because the particles interlock. This is very important for concrete block production.

· Suitable aggregates are usually obtained from natural sources (eg river beds, gravel pits, stone quarries, volcanic deposits) or from industrial by-processes (eg expanded clay, aircooled, granulated or foamed blast furnace slag, sintered fly ash, etc). All aggregates, whether fine or coarse, must be free from silt, clay, dust, organic matter, salts or other chemical impurities, that could interfere with the bond between cement and

aggregate or cause deleterious chemical reactions.

Aggregate-Cement Ratio

· After determining the correct blend of aggregates, the proportion of aggregate to cement must be found by trials with different ratios, eg 6:1, 8:1,10:1, up to 16:1 by weight, end testing the qualities of blocks produced.

· The proportion of fine aggregate to cement is of special importance: if the ratio is too high, the mortar will lack the cohesiveness needed for green strength and will be too weak to impart enough strength to the matured blocks; if the proportion is too low, the mortar will be very cohesive and the mix may not flow easily in handling and filling the mould.

Water-Cement Ratio

· Only water that is fit for drinking should be used to mix the concrete. The correct amount of water to be added to the mix depends on the types and mix proportions of aggregates and

cement, the required strength of the block, and the production method and equipment used. The concrete must contain just enough water to facilitate production without any slumping of blocks occuring after demoulding. If the aggregates are dry, they may absorb some of the water (lightweight aggregates may absorb up to 20 % by weight), but if the aggregates are wet, the blocks will take longer to dry out.

· As a simple test for cohesiveness, no excess water should be visible when a lump of concrete is squeezed in the hand, but if the sample is rubbed quickly on a smooth round metal bar or tube (2 to 4 cm in diameter) a slight film or paste should be brought to the surface.

Production Process

Batching and Mixing

· Aggregates can be batched by volume or by weight, but the latter is more accurate. For this reason, cement should only be batched by weight, or preferrably by using only whole bags of 50

kg. In backyard block production, with less stringent quality standards, batching by volume using buckets, tins, wooden boxes or wheelbarrows is quite acceptable, if done with care to ensure uniform proportions of mix.

· Since concretes begin to set within 30 to 60 minutes, depending on the type of cement and ambient temperature, only so much concrete must be prepared as can be used up before that happens. In hot climates, the fresh mix must be shaded from the sun to avoid premature setting.

· In case of hand mixing, it must be done on a level, smooth, hard surface (eg concrete slab or steel plate). Because of the relatively low cement content of the concrete and the need for a cohesive mix, thorough mixing is essential. Thus the best mixes are obtained with mechanically operated mixers.

Moulding

· Concrete blocks can be moulded by several methods, ranging from manually tamping the concrete in wooden or steel mould

boxes to large-scale production with 'egg-laying' mobile machines and fully automatic stationary machines. The quality of blocks generally increases with the degree of mechanization, but medium standards are normally adequate for most construction purposes. In all cases, the blocks are demoulded immediately after compaction, so that they have to maintain their shape even before the concrete hardens.

Curing

· The blocks are either left to set and harden where they were moulded, or carried away on pallets to the curing place. In all cases it is important to keep the concrete moist, for example, by regularly spraying with water, until the concrete has obtained sufficient strength. This can take 7 days or more, depending on the type and quality of cement. Quicker strength development is achieved by exposing the blocks to steam, but this is only viable in large scale factory production.

Building with Concrete Blocks

Design

· In order to minimize the need for cutting concrete blocks, all horizontal dimensions of walls should be multiples of nominal half blocks (most commonly 20 cm) and all vertical dimensions should be multiples of nominal full-heights (20 cm). This also applies to the positioning of doors and windows.

· In order to minimize the risk of cracking, the lengths of individual wall sections should not be greater than one-and-a-half times the height.

· Hollow blocks should be specified when good thermal insulation is required. These blocks are also useful when additional structural stability is needed, eg in earthquake areas, because the cavities align vertically and can be filled with reinforcing steel and concrete.

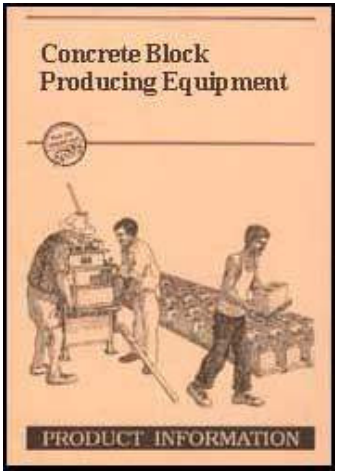
· Blocks with a rough surface (open textured), as in the case of most lightweight blocks, are advantageous, because they
- provide a better key for bedding mortar and applied finishes,

- have less capillary attraction for water and dry out more quickly after rains.

Construction

· Concrete blocks must be dried out thoroughly before use, otherwise drying will continue after building the wall and shrinkage cracks may develop. Only dry blocks should be used and they should not be wetted before laying. Instead the preparation of the mortar must take into consideration that the blocks absorb some of the water.

· Mortars used for bedding should not be too rich in cement. Cement: hydrated lime: sand mixes of 1: 2: 9 or 1: 1: 6 have a high water retention and good workability. It is important that the strength of the mortar does not exceed that of the blocks, so that the joints can absorb a limited amount of movement, preventing the blocks from cracking.



Equipment

In small-scale backyard blockmaking no special equipment is generally needed for making concrete blocks, if the concrete is mixed by hand and simple wooded or steel moulds are used. But with certain equipment the production process can be facilitated and the quality of blocks improved considerably.

Mixers

The quality of concrete blocks depends largely on the type of mixer and period of mixing. The free fall, revolving drum type

mixers are not suitable, because of the semi-dry nature of the mix. Pan mixers have a quick moving action and are thus recommended. Trough mixers are also suitable.

Blockmaking Machines

Several types of machines are available, ranging form simple hand-operated ones to complex stationary or mobile plants. The simpler machines are generally mechanically operated using electric, petrol or diesel power, while the larger machines are usually electrically operated. In most of the blockmaking machines, the concrete is compacted by vibration.

1. Hand-operated moulding equipment

These are relatively inexpensive, simple and robust devices, which are especially suited for on-site production of concrete blocks. Output rates for 40 x 20 x 20 cm blocks can range from 10 to 80 blocks per hour, depending on the efficiency of the machine, rate of supply of concrete and number of workers involved. There are basically three types:

· Steel moulds that can be carried around by one person and used on a raised working surface (eg table) or on the ground; the mix is tamped with the help of special tampers that fit on the mould, but is more usually compacted by means of a vibrator fixed to the mould or to the working surface (vibrating table).

· Stationary machines with the block mould (into which a wooden pallet is inserted) at about table height; the mix is usually compacted by the tamper lid-plate, which is brought down with a few sharp blows; after compacting, the sides of the mould fold back to release the block, or it is ejected by means of a lever, which pushes the base plate upwards, so that the fresh block can be taken away on the pallet for drying. Some of these machines are equipped with a tray above the mould for preparing the mix and filling it directly into the mould.

· Stationary machines that are similar to the previous type, but have an engine operated jolting mechanism or vibrator for more efficient compaction.

Advantages of hand-operated equipment:

+ Low capital and operational costs.
+ Quick delivery (possibly available locally).
+ Low weight and small size, thus easy to transport, requires little storage space.
+ Simple to use with a little training.
+ Low maintenance needs, apart from regular cleaning and lubrication of moving parts.
+ Possibility of repairs in local workshops, no special parts required.

Problems of hand-operated equipment:
- Low rate of production.
- In case of manual tamping, possibility of non-uniform compaction of concrete; since production rate is low and the use of fresh concrete mixes is limited to the setting time, relatively few blocks are produced per mix, which can differ in quality each time.
- Tiring operation, which can lead to a drop in the quality of blocks, if the work is carried out by a single person for too long.

2. "Egg-laying" mobile machines

These are machines designed for medium-scale production, either on-site or in a factory. The name was given to these machines, because they leave the blocks to dry where they are produced on a flat production surface and move a short distance away to produce the next batch of blocks, and so on. The machines, which can be manually operated or fully automatic, have output rates for 40 x 20 x 20 cm blocks ranging from 60 to 400 blocks per hour, depending on the size of machine, the degree of automation, availability of continuous supplies of concrete and production site organization.

Advantages of egg-laying machines:
+ Relatively high output of blocks.
+ Uniform quality of blocks, since more blocks are made from each concrete mix and most of the operations are mechanized.
+ Fairly easy to operate with a little training.
+ Suitability for use on-site or in a factory.

Problems of egg-laying machines:
- Rarely available locally, usually imported.
- Higher capital and operational costs than those of hand-

operated equipment.
- Requirement of large flat production area.
- Dependency on the weather, if not under a roof: in dry regions, if the blocks are not covered with plastic sheets, premature drying and cracking are inevitable; if it rains,production must cease, otherwise the green blocks will disintegrate.
- The higher the degree of automation, the greater the dependency on energy supplies.
- Repairs not likely to be possible in local workshops, if spare parts are not available.

3. Fully mechanized, stationary machines

These are automatic and very versatile machines used for the medium- and large-scale production of superior quality concrete components. They can be of various sizes, but are generally far more expensive than egg-laying machines of comparable sizes. The filling of the moulds, the compaction (vibration) and ejection of the blocks is done automatically, and output rates for 40 x 20 x 20 cm blocks can range from 200 to 800 blocks per hour. These high output rates are only possible with sophisticated ancillary

equipment for transportation, handling, stacking, etc, a well-trained staff, efficient management and sound financial base. Space is saved by stacking the green blocks in shelves, where they are usually steam cured for better product quality and quicker turnover.

Advantages of fully mechanized machines:
+ Very high output rates.
+ Superior and uniform quality of products.
+ Greater adaptability to the production of special concrete products.

Problems of fully mechanized machines:
- Not available locally, have to be imported.
- Very high capital and operational costs.
- Dependency on uninterrupted energy suplies, high standard of ancillary equipment, skilled labour, good management and, above all, continuous high demand for the products.
- Limited mobility.
- Need for specialists for maintenance and repairs; spare parts usually expensive and difficult to get, or only after long delivery

time.

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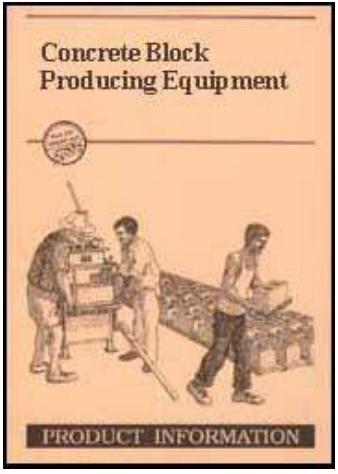

Criteria for selection and purchase

Equipment for concrete block production is available for various methods and scales of production, so that newcomers to this technology may find it difficult to decide which type of equipment is best suited for a particular situation. However, by

considering the following points, it should be possible to narrow down the choice, and avoid problems and disappointments after purchasing the equipment.

Type of Blockmaking Equipment

· Just as the second and third categories of blockmaking machines described above are generally more expensive than the previous category, there is also a roughly proportionate increase in output rates, variety and quality of products, dependency on special skills in manufacturing concrete products and maintaining the machines. Similarly, there is a distinct increase in the need for sophisticated additional equipment for batching, mixing, transporting, storing, curing, etc. Thus, even if the difference in the capital costs of the machines is not very large, their respective operational costs can differ considerably.

· Each type of machine has different spatial requirements, depending on the method and speed of production. Whether in a factory or on a building site, the available space is an important determining factor. The largest area is normally needed by egg-

laying machines, the most suitable surface being that of a smooth concrete slab (thickness and width depending on the weight and operating width of the machine), with a minimum slope of 1 in 100 (for drainage), and contraction joints at intervals of 3 to 4.5 m (depending on the slab thickness). The production area may also have to be covered if intense sunshine or rains are to be expected, both of which would damage the fresh blocks.

· The versatility of the machine is a further important criterium, that is, the possibility of providing a variety of moulds (even special ones made to order) which are easy to change in a short time (say less than one hour), the possibility of adjusting output rates to the local conditions, the possibility of switching from automatic control to manual operation in case of power failure, etc.

·For machines that require energy sources other than manual labour, their use is dependent on the local availability and cost of such energy. For instance, power failures may occur frequently or engine fuel may not be supplied regularly, as can be the case

in many rural areas in developing countries.

Productivity

· As with all production equipment, the rate of output claimed by the manufacturer is usually a theoretical figure for production under ideal conditions. However, problems, such as shortage of energy supplies or raw materials, breakdown of machines, shortcomings of the operators, harsh weather conditions and several other factors, can greatly influence the productivity of a machine, so that the real output rate in the field can be up to 50 % less than expected.

· Before aiming for a high output rate, it is essential to investigate the market potential of concrete blocks. If it is a new product in that area and its acceptance difficult to judge, it will be safer to begin with a low output, manually operated machine, and change to higher output machines when the demand increases and is likely to remain at a high level.

Operation and Maintenance

· The posture of the operator, the distances he has to move and the kind of movements needed are all factors that influence the efficiency of operation, which in turn depends on the design of the machine. This is also of importance with regard to the accessibility of vital parts for cleaning, servicing and repairs.

· Special attention should be given to safety measures, such as avoidance of projecting moving parts, clearly marking and/or protecting dangerous points, incorporating thermal fuses, secuity pins, etc. With egg-laying and stationary machines it is important that guards are positioned around mechanically moving parts, and that these guards cannot easily be removed. Automatic machines must at all cost be equipped with an emergency stop switch, which is easily accessible.

Material Quality

· Hand tamping is not likely to lead to the superior values for the strength, density, durability and consistency of blocks obtained by vibration. However, for many construction applications, such as basic housing, these values would not need to be especially

high.

· Apart from the method of compacting the concrete, the method of extruding and transporting the fresh blocks also influences their quality. Jerky movements of the compacting head and moulds can cause cracks or deformations. Pallets must therefore be moved smoothly. But the less the green blocks are handled before developing strength the better. In this respect, an egg-laying machine has a distinct advantage. However, if the slab on which it works is not properly constructed, there is a risk that too much of the vibration used to compact one drop of blocks is transmitted to other recently demoulded blocks.

Manufacturer

· Equipment suppliers for concrete blockmaking plants range from small to large companies, with varying degrees of commercialization, offering a very diverse choice of products and services. The larger companies are usually better known, experienced in international trade and consequently reliable business partners. Small firms or their machines are often not so

well-known, because of small advertising budgets, hence their list of references can be small in spite of a good product.

· Personal visits to the manufacturer and/or sites at which their machines are in use should be undertaken as far as possible. The value of reference lists is to be able to meet or correspond with users, to learn about their experiences. If such lists do not contain addresses, these should be specifically asked for.

· Of special advantage are training courses, offered by some manufacturers. To be effective, they should not only include the production of blocks and other concrete products, as well as handling and maintenance of the equipment, but also the testing and use of the raw materials, as well as production management and design guidelines for building construction. Trainees should also learn to dismantle and assemble complicated machines, in order to understand their function and conduct repairs by themselves.

Purchase of Machine

· The "FOB" price (free on board) includes packaging, transportation and insurance costs of the machine within the retailer's country, This price can be artificially inflated in order to compensate for the reduction offered on the factory price.

· As regards sales or rental conditions, one must be suspicious of contracts providing for price indexing based on the number of blocks, etc produced or for payment of royalties for patent use, which is often not justified. A patent is not necessarily a proof of guaranteed quality and constructors often apply for patents for processes that are already of the public domain,

· It is advisable to include a penalty clause in the contract, to safeguard against late delivery.

· In the case of an after sales service contract, the waiting period for repairs and maintenance must be clearly indicated. A detailed handbook should be provided, including specifications of all spare parts and a maintenance plan, indicating operations necessary and expected maintenance frequency.

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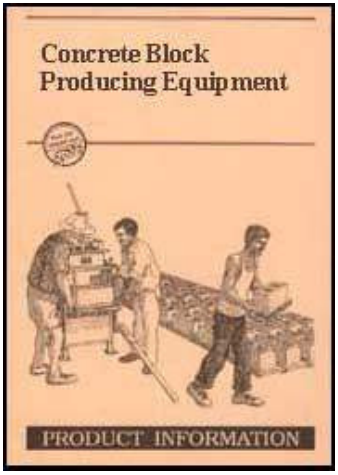

Checklist for potential buyers

The following is a summary of the main points to be considered when selecting the most suitable concrete block production equipment:

· Available financial resources (budget restraints can limit the choice considerably).

· Required quality of concrete blocks (single-storey low-cost houses do not need very high quality blocks, larger buildings and harsh climates may need stronger blocks).

· Required production rate (this depends on the expected market demand).

· Weight and mobility of equipment (these may have to be moved frequently from site to site).

· Available energy sources (not only the costs must be considered, but also the frequency of power failures and supply shortages of diesel, petrol, etc.).

· Availability of spares and skilled technicians for maintenance and repairs (machines with standardized parts create less problems).

· Versatility of equipment (machines with interchangeable moulds for a variety of items can bring about considerable savings).

· Operational safety (for this, several demonstrations of use, especially with unskilled workers, should be seen).

· References (contacts with equipment users should be sought whenever possible).

· Conditions of purchase (since machines with similar outputs are available, comparisons of prices, discounts for large orders, delivery time, etc. are urgently recommended).

· After sales services (not only should the manufacturers be fair enough to rectify defects of their machines by providing technical assistance or supplying spare parts a minimum or no-cost; users should also take the trouble to send accounts of their experiences and suggestions for improvements to the manufacturers. for without this feedback no effective development is possible).


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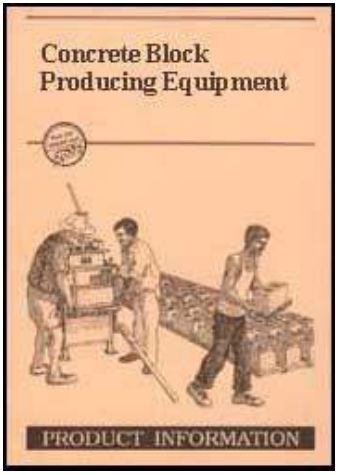


Parry/ITW multivibe blockmaking plant

Manufacturer
JPM Parry & Associates Ltd
Overend Road, Cradley Heath,
West Midlands B64 7DD
United Kingdom
Tel, [. . 44] 384 - 69171 (3 lines)
Tlx. 334132 it parr g
Fax. [. . 44] 384 - 637753

Description

The Multivibe is a multi-purpose, detachable vibrating machine for the small-scale production of concrete blocks and a large variety of other concrete building components. It is a portable machine which can be operated from any angle and can be clamped to a wide variety of forming tools, such as concrete block moulds, rooftile screeding machines, table surfaces or to the shuttering for'in situ' concrete work.

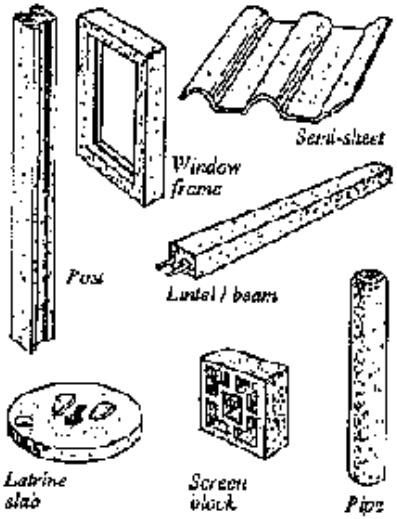
The Multivibe can be powered from any 12 volt DC source, car battery, or from the mains through a transformer rectifier, and is available in two capacities: 4 amp and 6 amp.

For concrete hollow block production, three standard sizes of mould are available to make blocks of different widths (10,15 and 20 cm, or 4, 6 and 8 inches), the length and height being constant (39 x 19 cm, or 15 x 7.5 inches). In addition, three standard moulds are available for making curved blocks to produce water tanks of 2 m, 3 m and 4 m diameters.

All components of the blockmaking plants are fully portable and can thus be used on any appropriate site with a flat surface large

enough to place the required number of blocks for curing. With appropriate accessory packs, it is also possible to switch between products (such as floor, wall or roof tiles, posts, lintels, pipes, window frames, latrine slabs and many others) at very short notice.

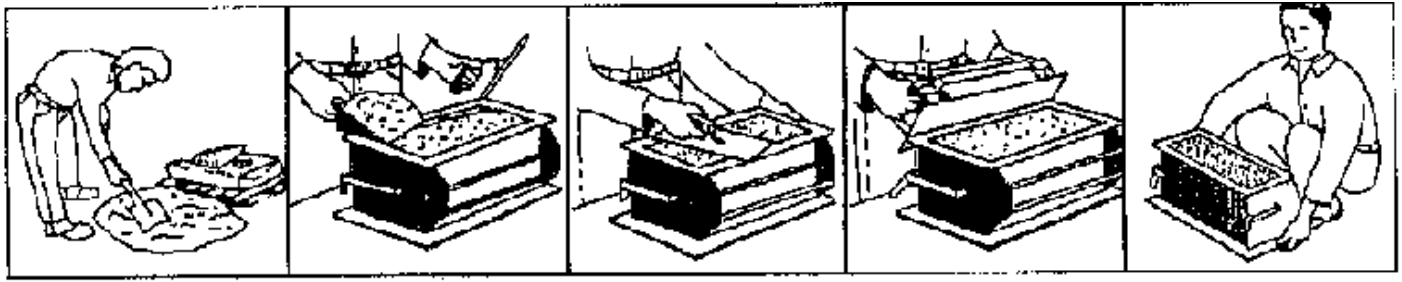
Other building components produced with the Multivibe concrete technology.



FIGURE

Technical Details	**Multivibe Blockmaking Plant**
Size of Multivibe (length x width x height)	59 x 21 x 13.5 cm
Weight of Multivibe	8 kg
Size of crate for shipment (whole plant BLP 80)	77 x 56 x 72 cm (30 x 22 x 28 in)
Weight of packed plant (BLP 80)	60 kg
Standard length x height of hollow blocks	39 x 19 cm (15 x 7.5 in)
Available widths of hollow blocks	10, 15 and 20 cm (4, 6 and 8 in)
Curved blocks available for 3 water tank diameters	2,3 and 4 m (80, 120 and 160 in)
Energy input/transmission	electric / mechanical
No. of blocks per cycle/output rate (BLP 80)	1/ 10 - 25 blocks per hour
Labour force required, depending on desired output	1 - 3 men

Price (FOB)	Optional plant sizes ace. to daily outputs: 80,120, 160 blocks	
valid dune 1991	BLP80	720 £ Sterling (≈ 1260 US$)
	BLP 120	940 £ Sterling (≈ 1650 US$)
	BLP 200	2655 £ Sterling (≈ 4650 US$)
	Included in each plant are: Multivibe, moulds, wash tub, scoop, float- and for BLP 200 a 1/4 tonne ground lift truck.	
	Additional mould	180 £ Sterling (≈ 315 US$)
	Additional vibrator	345 £ Sterling (≈ 610 US$)



Mix sand, aggregate and cement well

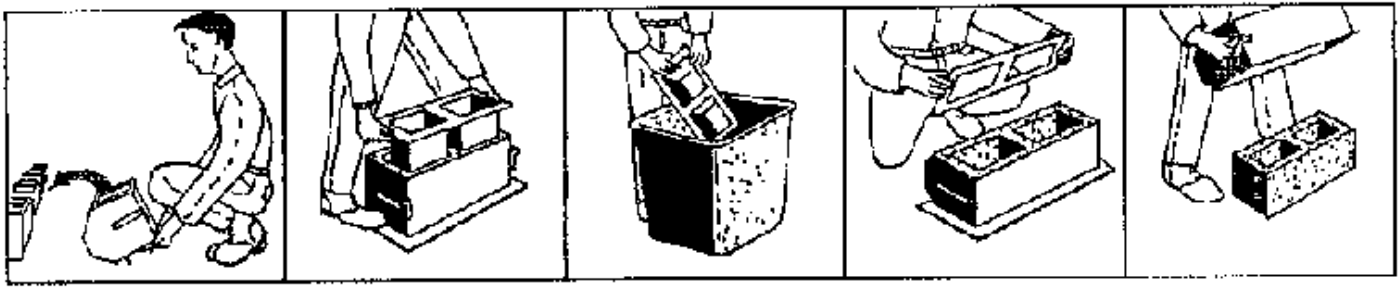
Fill the mould to depth of about one inch, switch

Switch off Multivibe and finish with float

Remove Multivibe

Carry mould to storage area and set down

on Multivibe and fill mould to top



Roll mould over until completely upturned

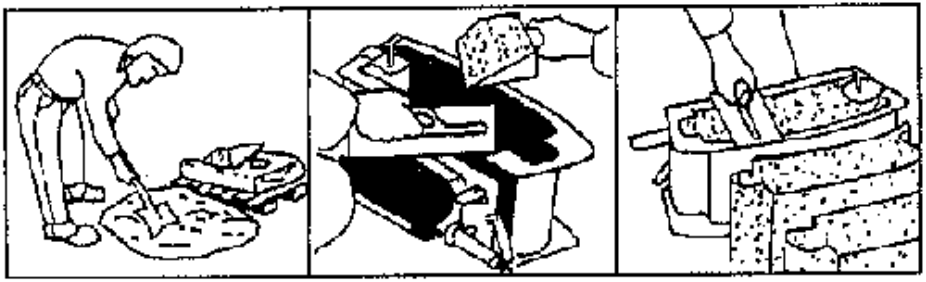
Hold mould on side with toes of shoes and lift out the centre core

Place core in tub

Lift off figure of eight and place in tub

Lift off outer mould and wash this together with the other parts

How a curved concrete block is made

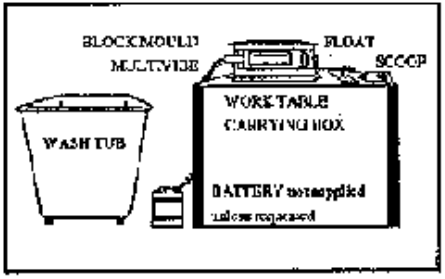


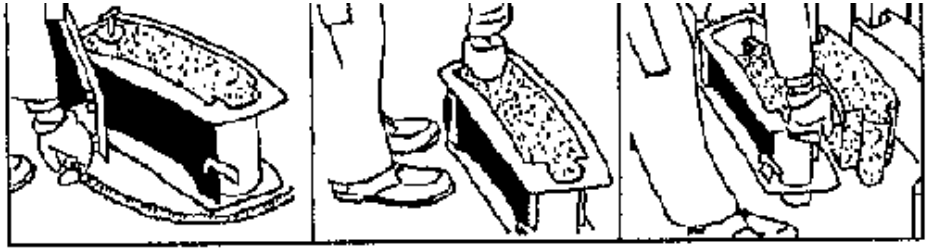
Mix sand, aggregate and cement well

The mould is filled with the correct mix of sand, cement and aggregate

The Multivibe is switched on and provides the vibration essential for good compaction

Equipment required for block production





FIGURE

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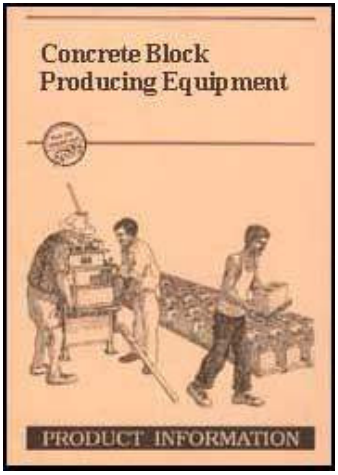

- Criteria for selection and purchase
- Checklist for potential buyers
- Parry/ITW multivibe blockmaking plant
- ELLSON Vibro concrete block machine
- ELLSON combination plain and hollow concrete block machine
- Jesson Lightning static brick/paver/block machine
- Jesson static junior MK 2 paver/brick machine
- Jesson Lightning II MK 2 / Lightning IV brick/block makers
- BlocMatic 4 series blockmaking machines
- Multibloc 5, 8, 12
- Fleming F - 100 block machine
- M. E.V. BM 636 F blockmaking machine

M. F. V. BM 646 F blockmaking machine

Bibliography

ELLSON Vibro concrete block machine

Manufacturer
Kathiawar Metal & Tin Works Pvt. Ltd.
9, Lati Plot (Sadgurunagar)
P.O. Box 202
Rajkot 360003 (Gujarat State)
India
Tel. [. . 91] 281 - 33663
Cable KAMETIN

Description

The ELLSON Vibro Concrete Block Machine produced in India since 1976, is an all-steel arcwelded construction, designed for the semiautomatic production of solid, hollow and cellular concrete blocks of different sizes. The main components of the machine are the frame the mould box and stripper-head, and the vibrator unit. Irrespective of the block type, only plain, locally

made wooden pallets are needed for each block produced.

The mould box and corresponding stripper-head can be replaced by other mould/stripper-head attachments, in order to produce concrete blocks and bricks of different types (solid hollow or cellular) and sizes. A standard block size is 40 x 20 x 20 cm (I x w x h), but a mould/ stripper-head attachment is also available to produce two blocks of 40 x 10 x 20 cm at the same time on a common wooden pallet. Single combination moulds with stripper-heads can be supplied to produce plain-ended blocks of different types (that is, solid, hollow or cellular), but with the same overall size. Similarly, moulds and stripper-heads are available to produce four bricks at a time on a common wooden pallet.

The vibrator unit consists of a vibrating platform supported on shock absorbing springs, and - fitted under the platform - a mechanical vibrator, which is driven via a single Vee rope pulley from a shaft with an arrangement for a flat belt fast/free drive at one end. The ELLSON Vibro has an extended detachable base, on which an electric motor can be mounted. The machine is supplied

without or with the electric motor and its flat-faced drive pulley. Altenatively, it is possible to drive the machine with a diesel engine, but the engine and the flat-faced drive pulley must be procured locally.

Operating the ELLSON Vibro

The mould box is lowered onto a previously placed wooden pallet resting on the vibrating platform of the machine. The stripper-head is swung sideways, completely exposing the top of the mould box, into which the concrete mix is fed to the top, ensuring that all the face walls and webs (in the case of hollow blocks) are evenly filled.

The mould is vibrated to allow the concrete to settle about 4 - 5 cm. The mould is then filled to the top with further material, the stripper-head swung forward and positioned over the mould, and the pipe handle lowered, making the stripper-head rest on the levelled material. The vibrator is fumed on again so that the pipe handle of the stripper-head comes down to its limit position (indicating the correct block height), whereupon the vibration

should be shut off immediately.

The stripping lever on the right of the machine is then pulled down completely to strip the block from the mould box. By doing so, the stripper-head still rests on the top surface of the block while the mould box moves up completely clear of the block. In order to raise the stripper-head off the block's top surface, the pipe handle is thrown back, and the freshly moulded block can then be carefully removed. resting on its pallet.

Anew pallet is oiled and placed on the vibrating platform under the raised mould and the operation repeated.

Technical Details	**ELLSON Vibro Concrete Block Machine**
Size of machine (length x width x height)	136 x 88 x 155 cm (54 x 35 x 61 in)
Weight of machine (incl. electric motor and I combination mould for 3 block types)	435 kg
Size of crate for shipment	100 x 100 x 168 cm (39 x 39 x

Size of crate for shipment	100 x 100 x 168 cm (39 x 39 x 66 in)	
Weight of packed machine	550 kg	
Standard block size (I x w x h)	a	40 x 20 x 20 cm (16 x 8 x 8 in)
Other block sizes	b	40 x 15 x 20 cm (16 x 6 x 8 in)
	c	40x 10x20cm(16x4x8in)
Energy input / transmission	motorized / mechanical	
No. of blocks per cycle/output rate (depending on manpower)	1 - 2/45 - 90 blocks per hour	
Labour force required (incl. mixing, carrying away blocks, etc)	5 - 11 men	

Price (ex works) valid dune 1991 Rs = Indian Rupees	ELLSON Vibro	32000 Rs (≈ 1600 US$)

	(incl 3 comb.moulds in diff. sizes for solid, hollow (or cellular)
	blocks, electric motor, scoops, sample wooden pallets and packing)

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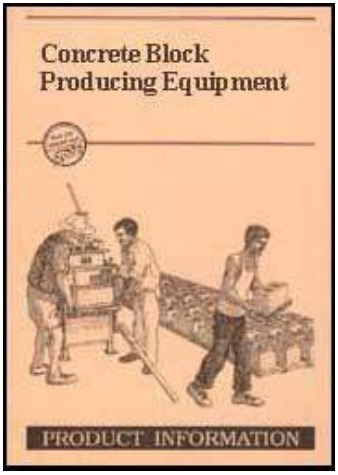

ELLSON combination plain and hollow concrete block machine

Description

The ELLSON Combination Plain and Hollow Concrete Block Machine, produced in India since 1958, is an ail-steel welded device, which is manually operated and produces both plain (solid) and hollow (twin rectangular cavitied) concrete blocks of the same overall size using the same mould. Apart from the mould, the machine comprises a hopper tray, a lid plate which is used to compact the block, and a lever to eject the block. The cores for forming the cavities of hollow blocks are fixed to the bed of the mould.

In addition to the concrete block machine, a wooden pallet is required for each block produced, ie plain pallets for solid blocks, and pallets with two rectangular cavities for hollow blocks.

With special inserts in the mould box, the height of the blocks can be decreased, but modified versions of the machine are available on request to produce four bricks at a time on a common pallet or solid blocks of different thicknesses using the same mould.

Operating the Combination Block Machine

The machine is first adjusted to the desired block height by placing suitable inserts into the mould, and before each new block is made, a wooden pallet is oiled and dropped into the mould. The tamper plate (which enters the mould box) can be adjusted to enter the mould box to different depths, depending on the block size, that is, the loose mix is usually compacted to about 75 % of its original volume.

A large variety of fine and coarse aggregate can be used for the concrete mix, hence the mix proportions of cement and aggregate will vary according to the type and quality of ingredients. However, the mix should not be richer than one part (by volume) of cement to six parts of mixed fine and coarse aggregates.

The fresh concrete mix is loaded onto the hopper tray, from which the machine operator feeds the mould. The surplus material is scraped off with a trowel and, using both hands, the tamper lid plate is brought down with a few sharp blows on the top of the mould box, tamping the block to the required density. By pulling down the lever, the block is ejected together with the

wooden pallet, such that the pallet and block can be carried away to a level, shaded drying area. When the block is sufficiently hardened, the block is fumed onto one side and the pallet is removed, cleaned and oiled for the production of a new block, while the previous one is left to cure by keeping it moist (by regularly spraying water) for at least 7 days. Before using the block in wall construction, it must be completely dried.

Other ELLSON Equipment

A third member of the ELLSON family of machines for blockmaking is the ELLSON Blockmaster Soil Block Press (described in detail in GATE Product Information: Soil Block Presses). It is a manually operated, allsteel construction, manufactured in India since 1959, and is one of the oldest soil block presses that is still being produced.

Technical Details	ELLSON Combination Block Machine
Size of machine (length x width x height)	95 x 75 x 100 cm (37 x 29 x 39 in)

Weight of machine,	220 kg	
Size of crate for shipment	110 x 88 x 103 cm (43 x 35 x 41 in)	
Weight of packed machine	310 kg	
Standard block size (l x w x h)	a	40 x 20 x 20[15] cm (16 x 8 x 8[6] in)
Other block sizes	b	40 x 15 x 20[15] cm (16 x 6 x 8[6] in)
	c	40 x 10 x 20[15] cm (16 x 4 x 8[6] in)
Energy input	manual	
No. of blocks per cycle/output rate	1 /50 - 75 blocks per hour	
Labour force required (incl. mixing, carrying away blocks, etc)	6 - 7 men	

Price (ex works) valid June 1991	Combination Machine (incl. I mould, scoops, sample wooden pallets, packing)	13500 Rs (≈ 675 US$)

Rs = Indian Rupees	Same as above, but with 2 moulds	16500 Rs(≈ 825 US$)

<TOC2>> Jesson Super D.I.Y. brick & block makers

Manufacturer
SARANICH Close Corporation
P.O. Box 243
Port Elisabeth 6000
South Africa
Tel. [. . 27] 41 -413173 /413152
Fax.[. . 27] 41 - 41 3154

Description

The Super D.I.Y. Machines, developed by Harold and Richard Jesson, are all-steel constructions, designed for do-it-yourself concrete brick and blockmaking by a single operator. Four machines are available, one for making bricks (6 at a time) and the others for making single hollow blocks of three different

widths (22, 15 and 10.4 cm), but the same design can be modified to produce other brick or block sizes, if there is sufficient demand for them, that is, minimum 50 units of each modified design.

The production process, including the compaction of the concrete, is entirely manual, extremely simple to carry out and permits a high output rate, as the blocks and bricks are left to dry where they were moulded ("egg-laying" principle), saving the time and effort otherwise needed to carry away the fresh products.

No aluminium or alloys are used in the construction, which is made to last for about 24 months, if used daily and maintained reasonably well. It is painted with steel primer first and then with oil based paint.

Operating the Super D.I.Y. Machines

A level, hard and clean production area of 150 to 200 m2 is required for concrete brick or block production. The whole work

can be done by a single person' although far greater efficiency can be achieved, if the operator does not also have to prepare the toncrete mix.

In order to produce 1000 concrete bricks, 2 m3 of crushed stone and/or sand plus 5.5 bags of cement are required. For making concrete blocks, the crushed stone should not be larger than 6 mm and should have a fines content of 25 to 30%, while the sand must be coarse and clean - not plaster sand. 1 m3 of this aggregate plus 3.5 bags of cement are needed for 100 blocks of 22 cm width; the corresponding figures for 15 cm blocks are 0.9 m3 aggregate plus 2.75 bags cement, and for 10.4 cm blocks are 0.8 m3 aggregate plus 2.5 bags cement.

For each batch of mix, 4 wheelbarrows of aggregate are dry mixed with 0.5 wheelbarrow of cement, and just enough water (normally 35 to 40 litres) is added to ensure that binding takes place. These are, of course, recommendations which can be varied to suit the local conditions, requirements and type of material available. Each wheelbarrow load of concrete mix will produce 32 bricks, or 4, 5 and 7 blocks of 22 15 and 10.4 cm

width respectively.

When the mix is ready, the mould box is placed in front of the operator at one end of the production line. The mould box is filled with concrete up to the top of the dividing plates for bricks (or up to the top of the mould box for blocks). Into the 2 tubes on the mould box sides, the compactor is fitted and rammed up and down several times until the compactor feet on the sides touch the ground, indicating the correct height of the bricks (block).

While stepping on the compactor feet to hold them down, the operator grasps the yellow mould box handles and, ensuring that the compactor feet do not move, pulls the mould straight up until the hands reach the top of the compactor frame. Then, stepping off the compactor feet, the operator lifts up the whole machine carefully, so that the bricks' (block's) edges are not damaged, and steps back to put the machine down on the new "drop" site. The compactor is removed and the process repeated.

Technical Details	**Super D.I.Y. Brick & Block**

	Makers	
Size of machine (length x width x height)	85 x 30 x 70 cm (33 x 12 x 28 in)	
Weight of machine	20 kg	
Size of carton for shipment	85 x 30 x 70 em (33 x 12 x 28 in)	
Weight of packed machine	25 kg	
Standard brick size (I x w x h)	a.	22 x 10.5 x 7.5 em (8.7 x 4.1 x 3 in)
Standard block sizes	b.	44 x 22 x 22 cm (17.3 x 8.7 x 8.7 in)
	c.	44 x 15 x 22cm(17.3x5.9x8.7in)
	d.	44 x 10.4 x 22 cm (17.3 x 4.1 x 8.7 in)
Energy input	manual	
No.of bricks per cycle/output rate (a)	6/ 240 - 300 bricks per hour	
No. of blocks per cycle / output rate	1 /40 - 50 blocks per hour	

(b, c, d)	
Labur force required (incl. mixing)	2 men

Price (ex works) valid June 1991 R = South African Rand	Super D.I.Y. Machine	450 R (= 170 US$)