



Introduction

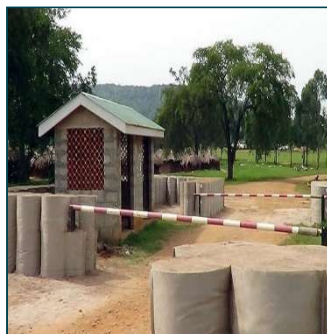
to

Defencell® MAC

Defense Barriers and Systems



Engineering a Better Solution



01

Product Introduction

- Product Information
- Proposed Application

02

Trials Undertaken

- COMMAND
- CFEES (DRDO)

03

Current Status & Way Forward

- Current Status
- Challenges
- Competition



Our History



Product :Early “FlexMac DT”

Activity : Force protection

Detail : Italian Army, WW1 (1914)

Product : DEFENCELL MAC

Activity: Periphery Wall

Detail: NATO (2018)



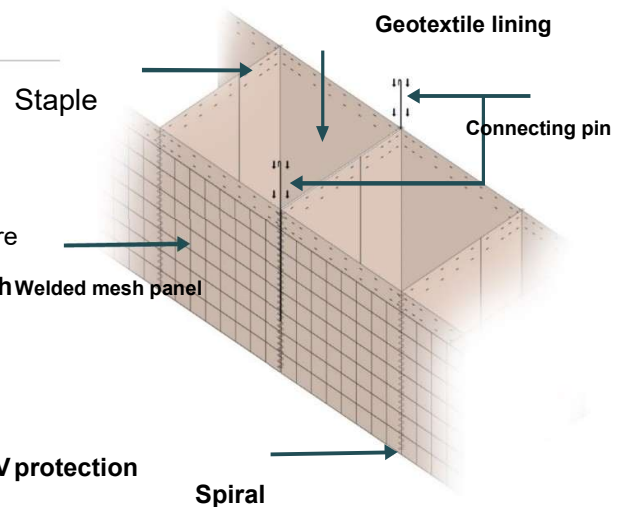
About Product

DEFENCELL



MAC

- **Welded mesh panel** Multicellular steel structure
- Welded wire mesh units with **high weld strength** Welded mesh panel
- **Special galvanised (Zn+Al) coated** mesh
- Connecting spirals between cells
- Connecting pins between units
- Heavy non-woven geotextile liner with **added UV protection**
- Wide range of sizes and unit dimensions to suit client needs



Global production hubs:

- Italy, Mexico, Malaysia, USA
- Large capacity manufacturing



Defencell Mac : Models & Proposed Application

Model	Height (m)	Width (m)	Length (m)	No. of Cells	Remarks
Mac 1	1.37	1.06	10.00	9	Protection for Standing Soldier and Fire
Mac 2	0.61	0.61	1.22	2	Tested for Small Arm Fire and No penetration
Mac 3	1.00	1.00	10.00	10	Suitable for Road-Blocks
Mac 4	1.00	1.50	10.00	20	-
Mac 5	0.61	0.61	3.05	5	Suitable for Mobile Bunkers
Mac 6	1.68	0.61	3.05	5	-
Mac 7	2.21	2.13	27.74	13	Full height protection, Army uses 65% of this model
Mac 8	1.37	1.22	10.00	9	-
Mac 9	1.00	0.76	9.14	12	-
Mac 10	2.21	1.52	30.50	20	Full height perimeter protection, Army uses 20% of this model
Mac 11	1.22	0.30	0.60	2	-
Mac 12	2.13	1.06	33.00	30	-
Mac 19	2.74	1.06	3.18	6	DRDO – CFEES Container ammunition protection
Defencell Lite	0.6	0.71	3.32	5	Vehicle check post , CFEES
Defencell Ranger	0.6	0.71	1.32	2	Potable defenses for foot soldiers, CFEES

Proposed Application

Alternative to Stone Masonry Walls in firing Zone



Proposed Application

Bunkers



Proposed Application

Ammunition Storage Areas



Proposed Application

Mobile Bunkers



Modular Traverses for ammunition Storage

Application Photos



Firing Range



Military Compounds



Forward Operating Base

Control Centers

Application Photos: Water & Flood Protection

Peripheral Walls



Application Photos: Nuclear & Other Vital Installation





Trials -

Combat Engg. Trial : Brief

Objective :

1. Ascertain utility of **modular protection system** for Indian Army vis a vis conventional system
2. **Blast/Ballistic/Fire tests**
3. Determine operational **feasibility of products**

Trial Location : Forward Post at Suratgarh, Rajasthan (India-Pakistan Border)

Trial Date : Last Week, May 2019



Defencell Mac : Trial Pics

Expected Result :

- Defencell Mac to be **endorsed** for full time use after Blast/Ballistic tests by the commanding officer
- **Procurement** of Defencell Mac through limited tenders in Northern, Western and South Western Command for Permanent Defenses and Border Outposts.
- Immediate procurement through **GEM / Tenders** for Bunkers, Safe Havens, Check Posts & Road Blocks



QEPB- Quick Erection Protection Barrier
Single layer Mac 1 topped with Mac 5



MBPS- Modular Ballistic
Protection System Base- 3 Mac 1,
1st Stack- 2 Mac 1, 2nd



DEFENCELL Lite
Stack- Mac 5

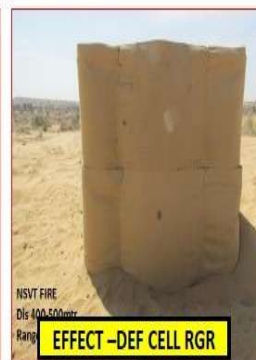
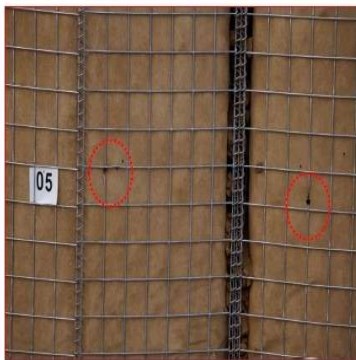
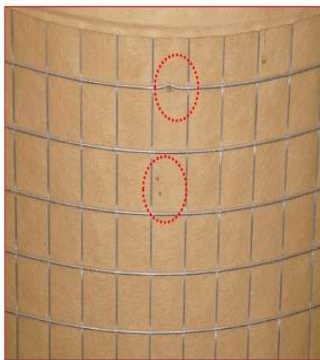


DEFENCELL Ranger

Blast/Ballistic Tests

Test No. 1: Small Arm Fire

S.N	Description of arm	Standoff Distance	Result (Penetration from front face) (max)	Remarks
1	INSAS Rifle 5.56mm	100 m	21 cm	TARGET REMAINED SAFE
2	Light Machine gun 7.62mm	100 m	24 cm	NO EFFECT ON TARGET WAS OBSERVED AND IT REMAINED SAFE.
3	NSVT (Tank gun) 12.7mm	500 m	30 cm	NO EFFECT ON THE REAR FACE OF MAC CAGE

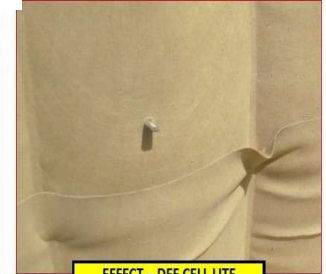


Small Arms fire- 5.56 & 7.62mm

NSVT Tank gun- 12.7mm

Blast/Ballistic Tests Test No. 2: Grenade

S.N	Description of arm	Standoff Distance	Result (Penetration from front face) (max)	Remarks
1	Auto Grenade Launcher 40mm (Direct)	500 m	32 cm	OVERALL DAMAGE WAS OBSD TO BE 5-10% NO EFFECT ON THE REAR FACE OF CAGE.
2	HE 36 grenade 0.5 Kg (Airburst splinters)	25 m	6 cm	OVERALL DAMAGE WAS OBS TO BE 2-5% MAC CAGES WERE LEAST AFFECTED BY THE SPLINTERS THERE WAS NO EFFECT ON OPPO SIDE OF MAC CAGE.

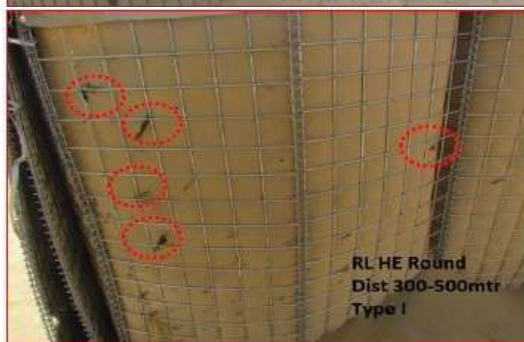


Auto Grenade Launcher 40mm

HE 36 Grenade Fire

Test No. 3: Rocket Launcher (Used to destroy Tanks)

S.N	Description of arm	Standoff Distance	Result (Penetration from front face) (max)	Remarks
1	High Explosive 84mm	450 m	8 cm	RL FIRED WITH AIR BURST MODE PENETRATION WAS 5-10% NO AFFECT THE TARGET BEHIND CAGES. TARGET WAS SUCCESSFULLY EVALUATED FOR SAFETY.
2	High Explosive Anti-tank 84mm	450 m	12 cm	DAMAGE - 30% WITH HE AND 55-60% WITH HEAT THE CAGE HAD TO BE REPLACED AFTER HEAT FIRE THE SAFETY OF PERS IN THIS CASE WAS SUSPECTED



EFFECT – QEPB TYPE I

EFFECT – QEPB TYPE II

Rocket Launcher 84mm

S.N	Description of arm	Standoff Distance	Result (Penetration from front face) (max)	Remarks
1	TNT 1 kg	Near face	15% (face damage)	ONLY THE CAGE WHERE EXP WAS PLACED GOT DAMAGED THERE WAS NO EFFECT ON OTHER CAGES.
2		5m	3%	NO EFFECT OF SHOCKWAVES OF DETONATION ON CAGES
3	TNT 5 kg	Near Face	38% (face damage)	SUBSTANTIAL EFFECT OF DAMAGE OBSERVED ON MAC CAGES DUE TO INCR QTY OF EXPLS, DETONATION AND SHOCKWAVE EFFECT.
4		7m	5%	MARGINAL EFFECT OBSD ON THE MAC CAGES.

Timing Tests Filling : Defencell Mac

Aim: To identify time with different fill material with arrangements during different time of the day were done in order to determine minimum time of installation both mechanically & manually

Result:

1. QEPB (20 min mechanically)
2. MBPS (30 min mechanically)
3. Defencell Lite-15 min manually (2 men)
4. Defencell Ranger-10 min manually(2men)





CFEES Trial

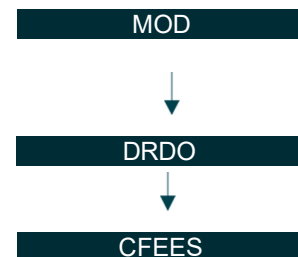
CFEES (Centre for Fire, Explosive and Environment Safety)

Objective

1. **Designing and testing of safe storage houses** for storage of ammunitions at all the forward posts of Indian Army
2. Ascertain utility of modular protection system for Indian Army vis a vis conventional system
3. Siting of explosive processing and **storage dumps** and the design, testing and evaluation of safe **explosive storage houses**
4. System of **storage of ammunitions** will minimize the impact of any explosion on another container

Trial Location & Date

Babina Fire Range ,Jhansi and 22 Oct 2019



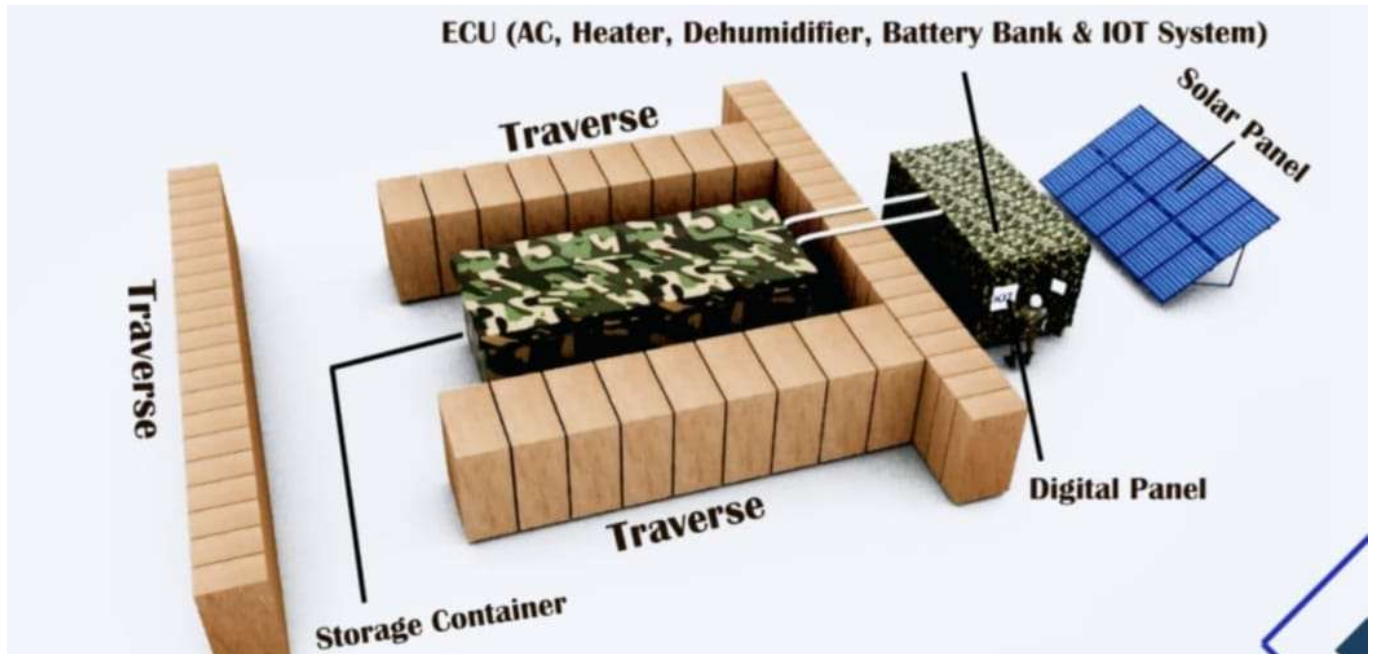
Expected Results

- **Letter from CFEES** regarding Defencell Mac usage for ammunition storage
- CFEES certification can be used ballistic/antiballistic technology be used in Indian Army Certification will help to **develop business without competition** for such applications



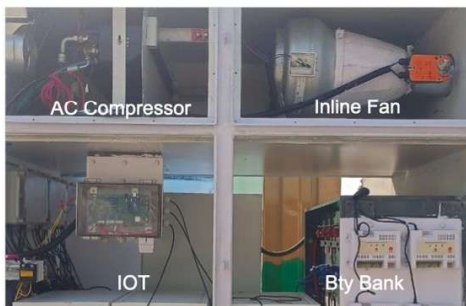
Storage of ammunition with Modular Ballistic Protection System (MBPS) using PECASS

(PORTABLE ENVIRONMENT CONTROLLED AMMUNITION STORAGE SYSTEM)



SALIENT ASPECTS OF PECAS SYS

- Enables fwd placement of ATGMs, fully portable
- Fn effectively in varied trn with temps ranging from +50 oC to -40 oC
- Provides air conditioned envt as per storage parameters of ATGM ranging from +5 oC to 18 oC
- 24V DC Power sys based on solar power integration



- Aerogel blanket insulation for optimal thermal protection
- IOT controller & Smart dashboard for real time monitoring of storage conditions
- Ground power supply unit prov as fail safe in case of adverse wx conditions

Approvals and Certification

Recommendation Letter -

भारत सरकार, गुरुग्राम
अग्नि, विस्फोटक एवं पर्यावरण सुरक्षा बोर्ड
वि. एम. के. मण्डल मार्ग, गुरुग्राम,
हिमाचल प्रदेश - 170012
फोन : 011 23261519
फैक्स : 011 23261517



Govt. of India, Min. of Defence
Centre for Fire, Explosive
& Environment Safety, (CFEES)
Brig. S. K. Muzumdar Marg,
Timarpur, Delhi-110054
Fax : 011 23261517
Phone : 23261519

Dated : 15th Jan 2020

All correspondence to be addressed to
Director CFEES

No.
CFEES/TASK/ESG/47/2020

सर्वे शांति निदेशक से एच. ई. ई. एच. के. के. से
भेजे जाने चाहिए

The General Manager
Maccaferri Environmental Solutions Pvt. Ltd.
Unit No. 404-409, 4th Floor,
Suncity Success Tower
Main Golf Course Extension Road, Sector-65
Gurugram, Haryana-122005

PARTICIPATION LETTER FOR ONE MT NEC HD 1.1 BLAST TRIALS

1. Please refer:

a) Our letter No. CFEES/ESG/051/1/2018 dated 12th Dec 2018.
b) Your letter for request of participation letter dated 17th Dec 2019.

2. We express our sincere gratitude for providing the modular traverses (Approx. 34m x 2.74m x 2m around the ISO container and approx. 11m x 0.74m x 0.6m on roof) for the trial for "Storage of Explosives in ISO Containers protected with modular traverses" conducted on 21st Oct 2019 at FFR Babina.

3. Following officials of M/s Maccaferri were associated for installation of traverses at site:

a) Sh Abhishek Pathak, Sr GM
b) Sh Sali Choudhary, Manager

4. The traverses were installed and filled in a short span of time (03 days) as compared to conventional traverses and will be helpful in field conditions.


(Gulshan Kumar Singh)
Scientist 'E'
For Director

Procurement for Trial - Indian



Sh Col P.K. Nayak
Project Officer

1528/DBS/1191/G

Mr Ankur Agarwal
Business Development
Maccaferri Environment Pvt Ltd
Unit No 403-409, Fourth Floor, Suncity
Success Tower, Main Golf Course Extension
Road Sector - 65, Gurugram
Haryana-122005

03 Jan 2019

03 Jan 2019

Dear Sir,

1. Refer discussion on the subject of supply 04 special items, namely :-

(a) Quick erection Prot Barrier (QEPB).
(b) Modular Ballistic prot sys.
(c) Def Cell life.
(d) Def Cell Ranger.

2. The quantity as stated in your mail and draft design as approved and shared between your office and this office is agreed and firmed in. Same has been got approved from Higher Headquarters as well.

3. You are kindly requested to proceed with the supply of items at the earliest.

Warm Regards



Ongoing Tasks

1. Registration with Government E- Market Portal (GEM)
2. Acknowledgment Letter from 61 Engineers - Trial Report
3. Suo-Moto Proposal to Army HQ
4. Submission with Innovations for Defense Excellence (iDEX)

THANKS

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