

SCANSHIELD

Ballistic Protection Systems



Abstract from ScanShield Report on Concept testing of Coverit and Rackit Ballistic Protection System 22. March 2006.

System description.

The ballistic protection system is designed for being mounted on a 20" container or mounted on a rack to form a protection wall. The system is constructed to withstand blast effect from explosions, fragments from these or projectiles fired from hand weapons.

The system encounters two basic elements:

The Coverit protection mat system formed by mat lanes (95cm x 398 cm) of fire resistant fabrics equipped with 9 pockets for placing ballistic tiles of the size 44cm x 88cm with a protection capability adjusted to the actual threat. For fastening, the mats are equipped with two strong lengthwise mounted zippers and at one end five metal fortified rings for lashing. The total weight of Coverit excl. tiles is 8,2 kg when a 720 gr/sq.m. fabric (standard) is utilized.

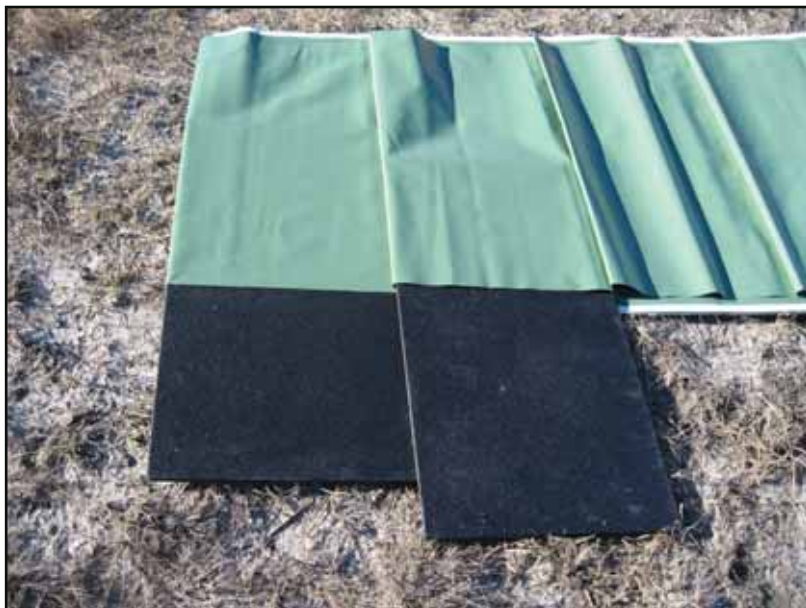


Fig.1. Coverit shown with two ballistic tiles

The Coverit can be used as mounted on a 20" standard container in order to cover this totally or partly and for mounting on the Rackit to form of protection wall of any length required.

The other part of the protection system is a steel rack marketed as Racket. The Racket is foldable and made from 60x30x3 mm cold rolled steel/37 and 2" steel/37 pipes weighing totally 26 kg and with a size of 260 cm x 76 cm. Erected it forms an angle of 71 degrees to horizontal thus raising 240 cm in total from the ground.



Fig.2. Three Racket mounted with Coverit.

When the Coverit is mounted on the Racket 6 pockets are placed on the front and 3 on the rear and hooked on the rear of the Racket. By placing the Rackets close together the mounted Coverits can be zipped together and thus forming a wall of an indefinite length.

The protection tiles used for the test were coated HARDOX 500 weighing 30 kg and made by Rosshield A/S, Hestehaven 51, Odense S.



Fig.3. 20"standard container totally covered by Coverit.

Test Scenario

The test was conducted by the Danish School of Engineers in the Trandum Firing Range on the 22. March 2006. The Royal Danish Naval Material Command, Section for Ammunition and Logistics, was responsible for the photographic documentation.

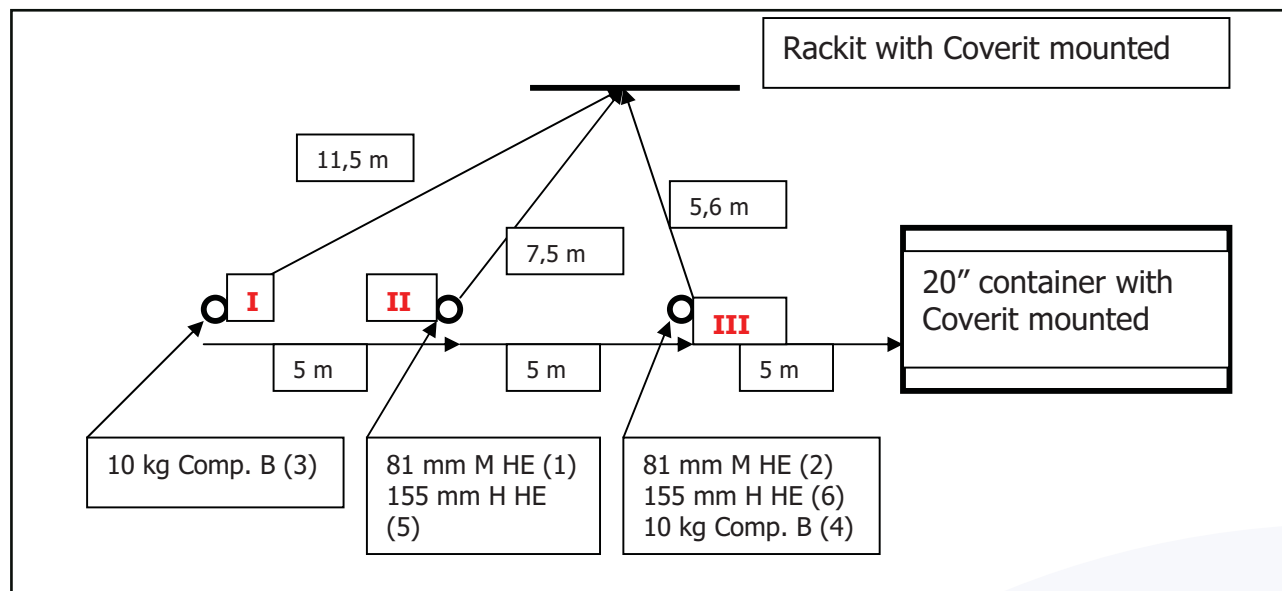


Fig. 4. Schematic test scenario

The explosives used for the test were:

- Test # 1: 81 mm Danish mortar bomb M/48 FA at position II
- Test # 2: 81 mm Danish mortar bomb M/48 FA at position III
- Test # 3: 10 kg Composition B Explosives at position I
- Test # 4: 10 kg Composition B Explosives at position III
- Test # 5: 155 mm H projectile, HE M107 at position II
- Test # 6: 155 mm H projectile, HE M107 at position III

For test results please consult Appendix A.

Conclusion

General.

During the test the Coverit and Rackit was not changed and in consequence the impact from the explosives were accumulated. Thus the impact on the last two tests should be seen as the effect from multiple hits.

Coverit

The test showed that the Coverit can maintain the ballistic tiles in position after multiple impact from explosions up to 155 mm HE M107 grenade detonated at a distance down to 5 m. The fabrics used did not at any stage show traces of influence of the high temperature they were exposed to.

Rackit

The test showed that the Rackit, with a minor displacement, as a minimum can withstand the impact from explosions by up to 155 mm HE M107 detonated at a distance down to 5 m.

Ballistic protection tiles

The test showed that the coated HARDOX 500 steel plates made by Rosshield, can withstand fragments from 81 mm mortar bomb and the blast impact from 10 kg Composition B explosives both detonated at a distance down to 5 m.

It is estimated that the HARDOX 500 tiles can reduce fragments penetration from 155 mm M107 grenades by min. 85 % with impact at a distance down to 5 m.

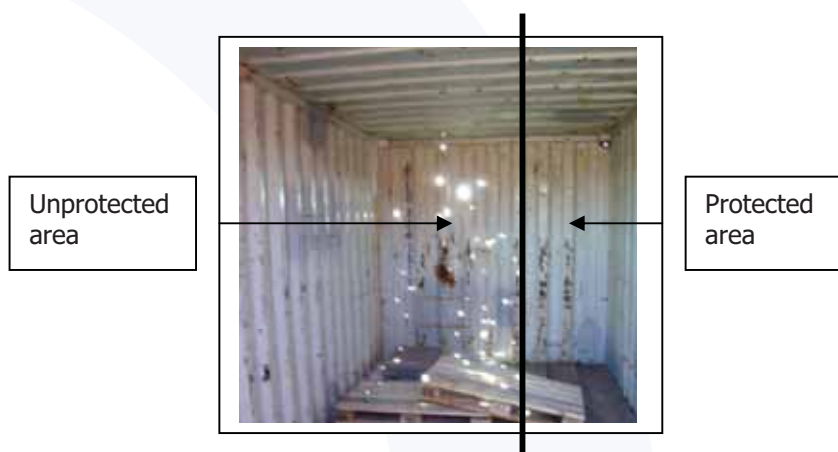


Fig.5. 20"container inside after two 155 mm projectile explosions at down to 5 m

Appendix A.

Testscenario and - results for Coverit and Rackit, Tranum Firing Range, Denmark 22. March 2006

1. Coverit mounted with 10 mm, 30 kg HARDOX 500 steel plates
2. Coverit with steel plates mounted on a 20" steel container and on the Rackit wall.
3. Coverit, Rackit and steel plates were not replaced during the test. All damages accumulated during the test.

Test	Explosives	Range	Container	Rackit wall
# 1	81 mm Danish Mortar bomb M/48, FA, placed on the ground (impact)	10 m to container, 7,5m to Rackit	Fragments minor traces on <i>Coverit</i> and no impact on steel plates	As for "container". <i>Rackit</i> position unchanged
# 2	81 mm Danish Mortar bomb M/48, FA, placed on the ground (impact)	5m to container, 5,6m to Rackit	Fragments minor traces on <i>Coverit</i> and no impact on steel plates	As for "container". <i>Rackit</i> position unchanged
# 3	10 kg Composition B explosives placed 1 m over ground	15 m to container, 11,5 m to Rackit	No impact on <i>Coverit</i>	No impact on <i>Coverit</i> . <i>Rackit</i> position unchanged
# 4	10 kg Composition B explosives placed 1 m over ground	5 m to container, 5,6 m to Rackit	Major impact on <i>Coverit</i> , as one zipper broke due to unsatisfactory mounted	No impact on <i>Coverit</i> . <i>Rackit</i> position changed 2 cm backwards
# 5	155 mm H projectile , HE, M 107, placed on the ground (impact)	10 m to container, 7,5 m to Rackit	A few of number penetrations of fragments n of steel plates. Major scares on <i>Coverit</i> , however still functional.	A few number of penetration of fragments of steel plates. Major scares on <i>Coverit</i> , however still functional. <i>Rackit</i> position changed 3 cm
# 6	155 mm H projectile , HE, M107, placed on the ground (impact)	5 m to container, 5,6 m to Rackit	Limited number of fragments penetration of steel plates. Major scares on <i>Coverit</i> , limited functionality.	Limited number of fragments penetration of steel plates. Major scares on <i>Coverit</i> , limited functional. <i>Rackit</i> position changed 5 cm.

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