FORCE OF AMMUNITION

9 MM LUGER LIBRA SNAIL
WITH

HIGH PENETRATION

Type	Weight of bullet (g)	v_3 (m.s^{-1})
9 mm LUGER LIBRA SNAIL	6,5	500
9 mm LUGER LIBRA SNAIL	2,9	780

Picture 1 – 9 mm LUGER LIBRA SNAIL 2,9 g

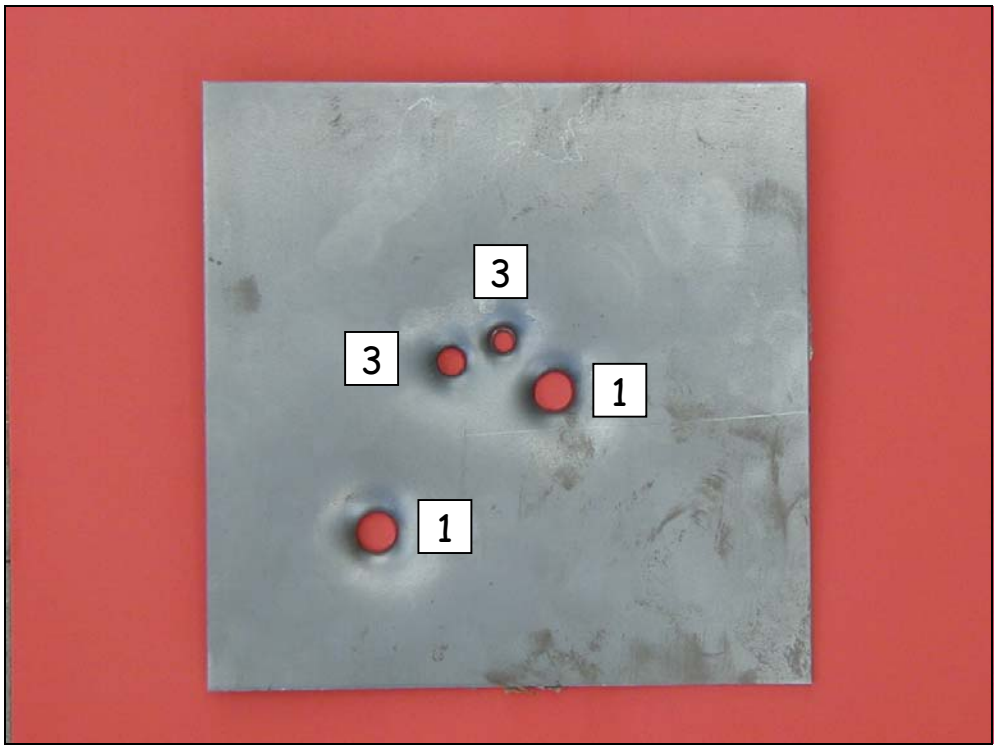
Picture 2 – 9 mm LUGER LIBRA SNAIL 6,5 g

Force of ammunition 9 mm LUGER LIBRA SNAIL was tested on steel plate of different type and thickness. There is a list of ammunition and guns in Table 1, which were used for testing:

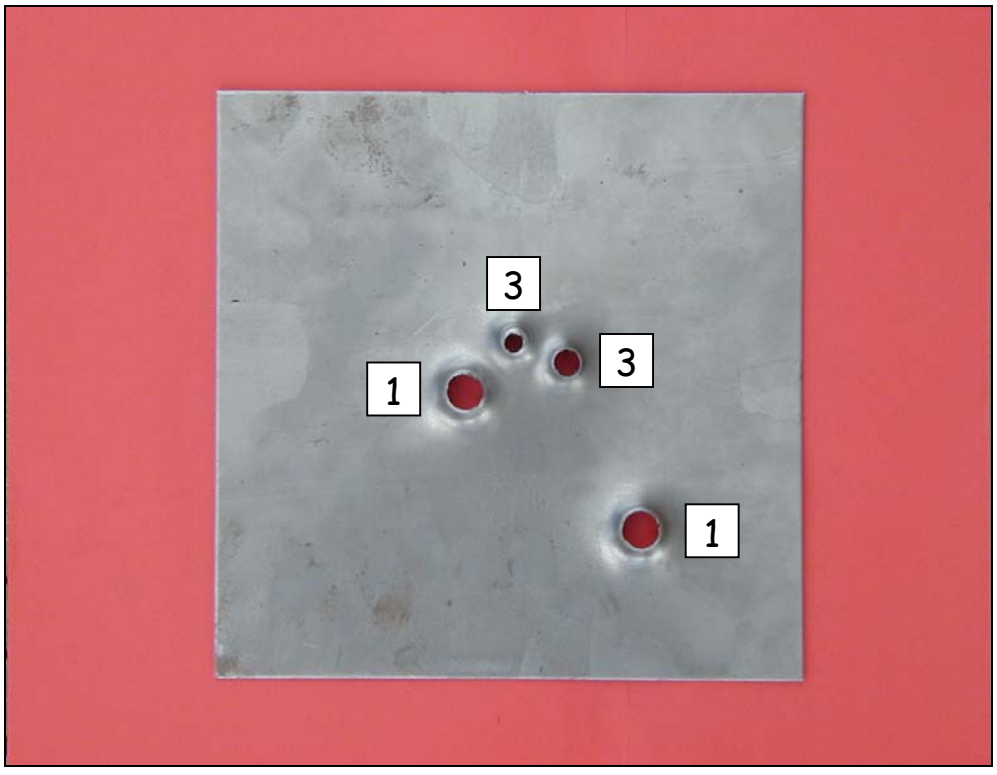
Nr.	Ammunition	Core	Producer	Gun
1	9 mm LUGER	lead	S&B	Gun – CZ 75
2	9 mm LUGER	lead	S&B	Auto. gun – HK MP5A5
3	7,65 Browning	steel	S&B	Auto. gun – CZ vz. 61
4	7,62x25 Tokarev	steel	ayn 53	Gun – CZ vz. 52
5	9 mm LUGER LIBRA SNAIL – 6,5 g	steel	LIBRA a.s.	Gun – CZ 75
6	9 mm LUGER LIBRA SNAIL – 6,5 g	steel	LIBRA a.s.	Auto. gun – HK MP5A5
7	9 mm LUGER LIBRA SNAIL – 2,9 g	steel	LIBRA a.s.	Gun – CZ 75
8	9 mm LUGER LIBRA SNAIL – 2,9 g	steel	LIBRA a.s.	Auto. gun – HK MP5A5
9	7,62x39	steel	S&B	Auto. gun – SA vz. 58
10	9 mm LUGER (r. 44)	steel	S&B	Ballistic barrel
11	9 mm LUGER LIBRA SNAIL – 6,5 g	steel	LIBRA a.s.	Ballistic barrel
12	9 mm LUGER LIBRA SNAIL – 2,9 g	steel	LIBRA a.s.	Ballistic barrel

Table 1 – List of ammunition and guns used for testing of force of 9 mm LUGER LIBRA SNAIL

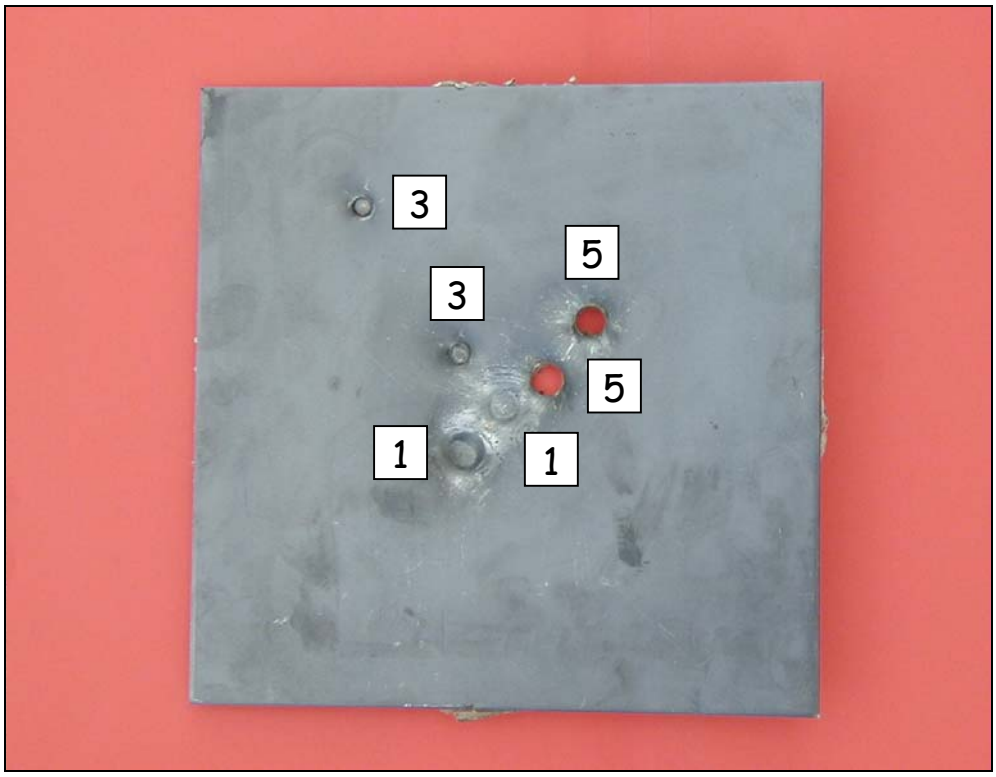
Distance for shooting – 7 m, only steel plate HARDOX – 5 m.
Velocity of 9 mm LUGER LIBRA SNAIL 6,5g is $v_3 = 500$ m.s^{-1}
Velocity of 9 mm LUGER LIBRA SNAIL 2,9g is $v_3 = 780$ m.s^{-1}



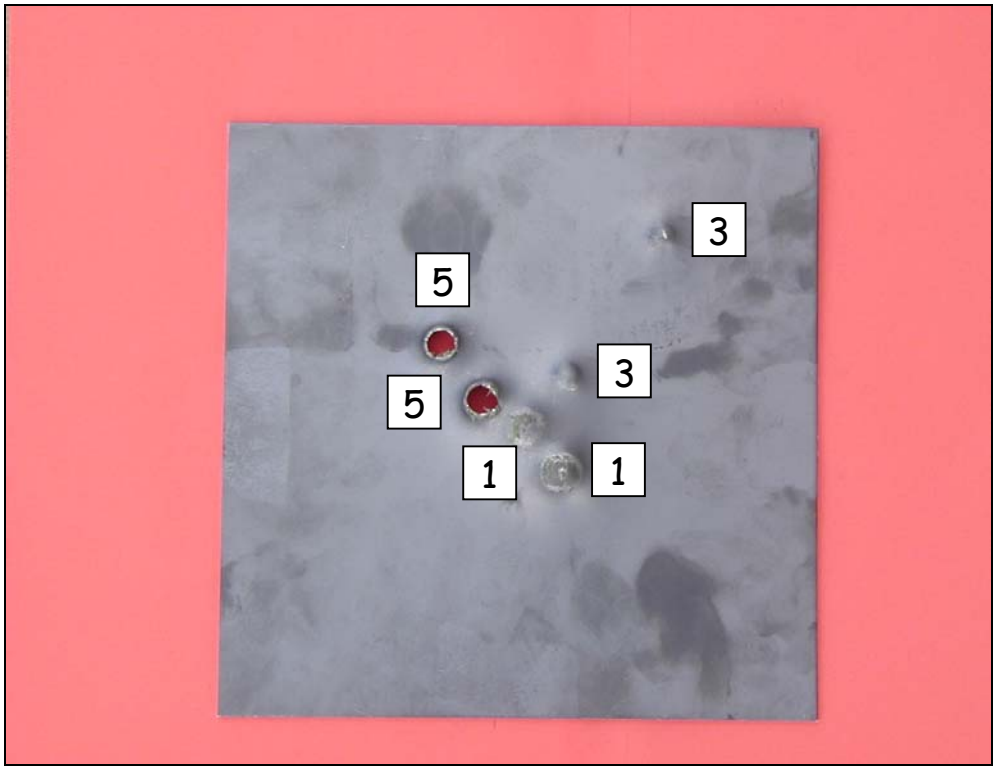
Picture 3 – Steel plate 2 mm, material 11321, side of shoot in



Picture 4 – Steel plate 2 mm, material 11321, side of shoot out

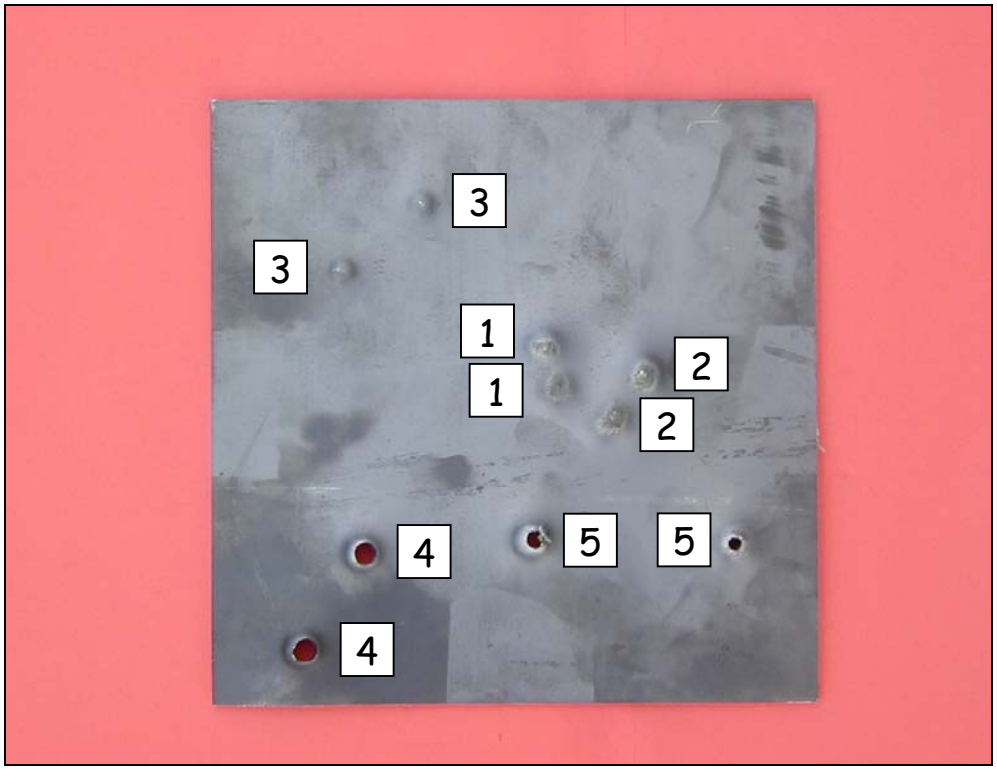


Picture 5 – Steel plate 3 mm, material 11373-75, side of shoot in

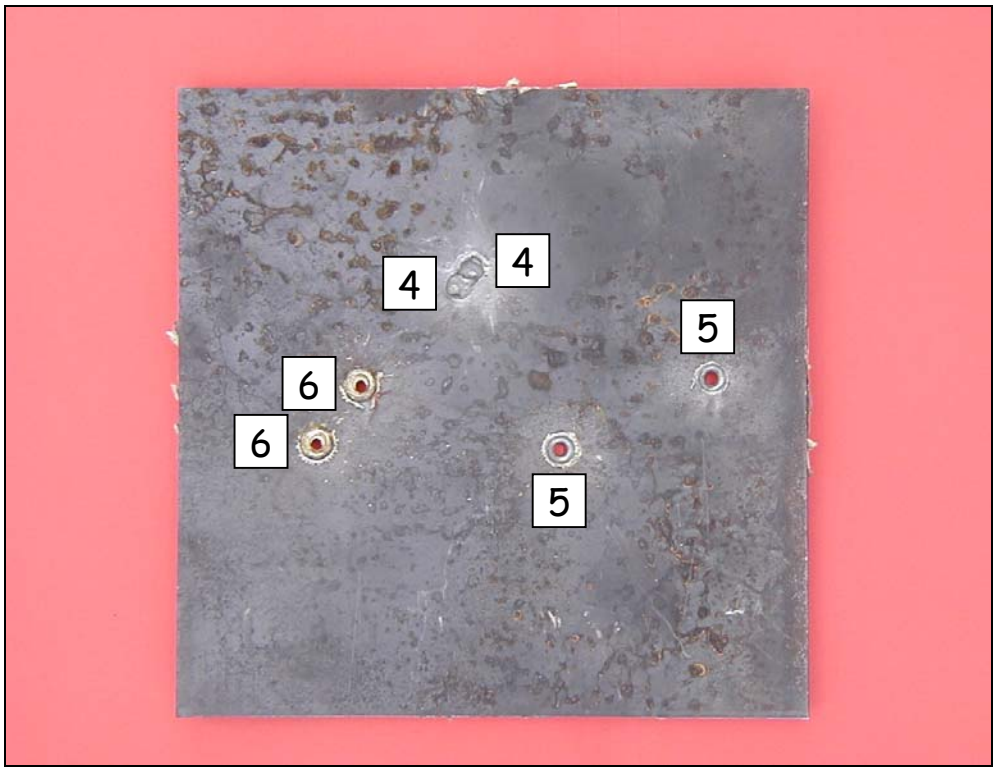


Picture 6 – Steel plate 3 mm, material 11373-75, side of shoot out

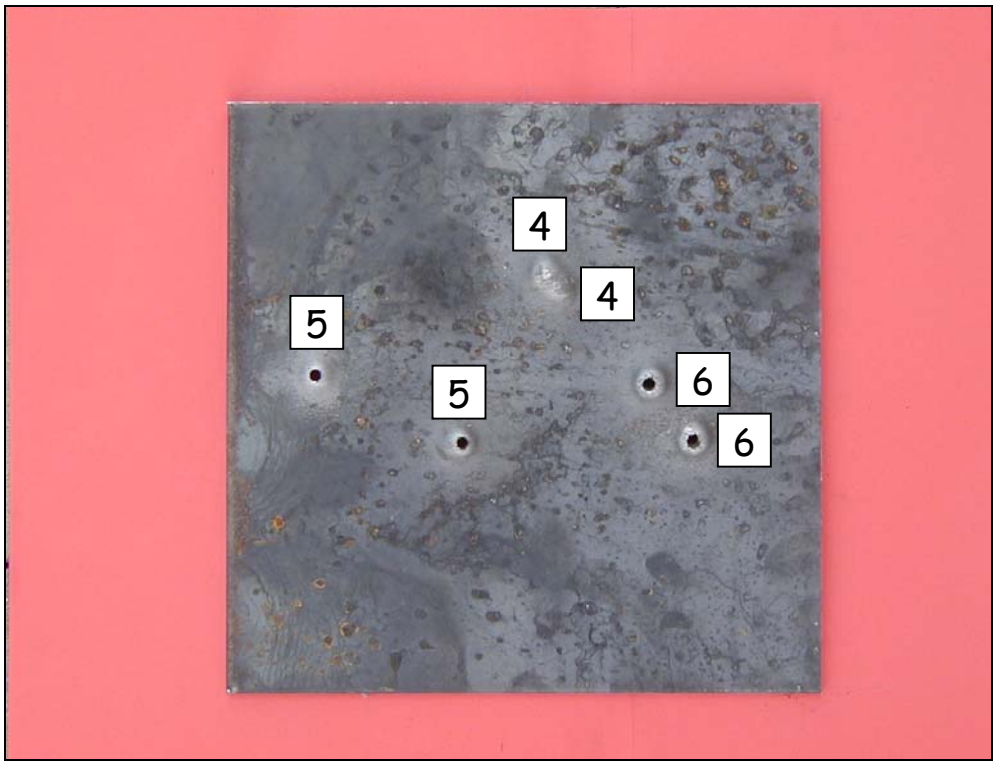
Picture 7 – Steel plate 4 mm, material 11373-75, side of shoot in



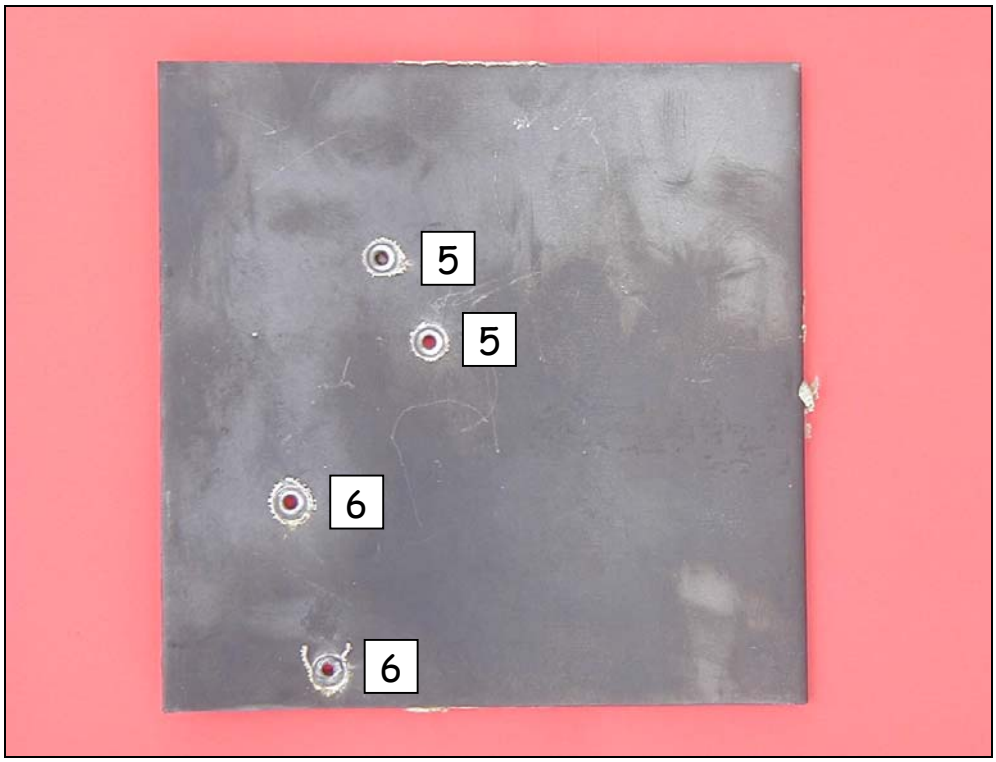
Picture 8 – Steel plate 4 mm, material 11373-75, side of shoot out



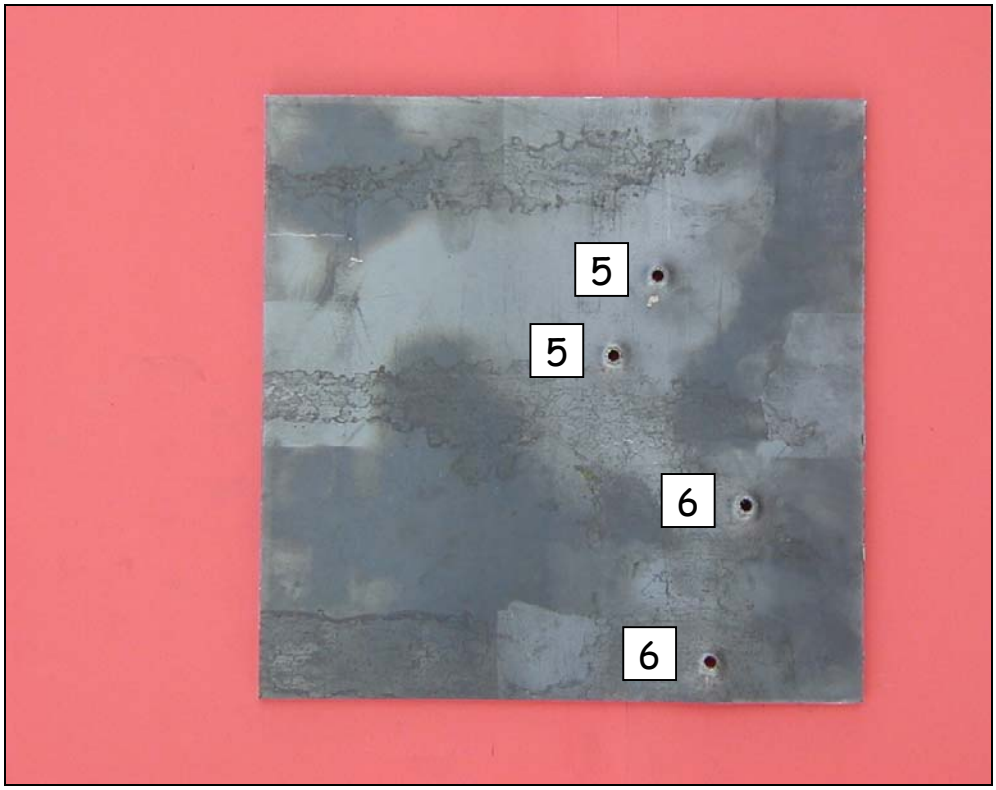
Picture 9 – Steel plate 5 mm, material 11373-75, side of shoot in



Picture 10 – Steel plate 5 mm, material 11373-75, side of shoot out

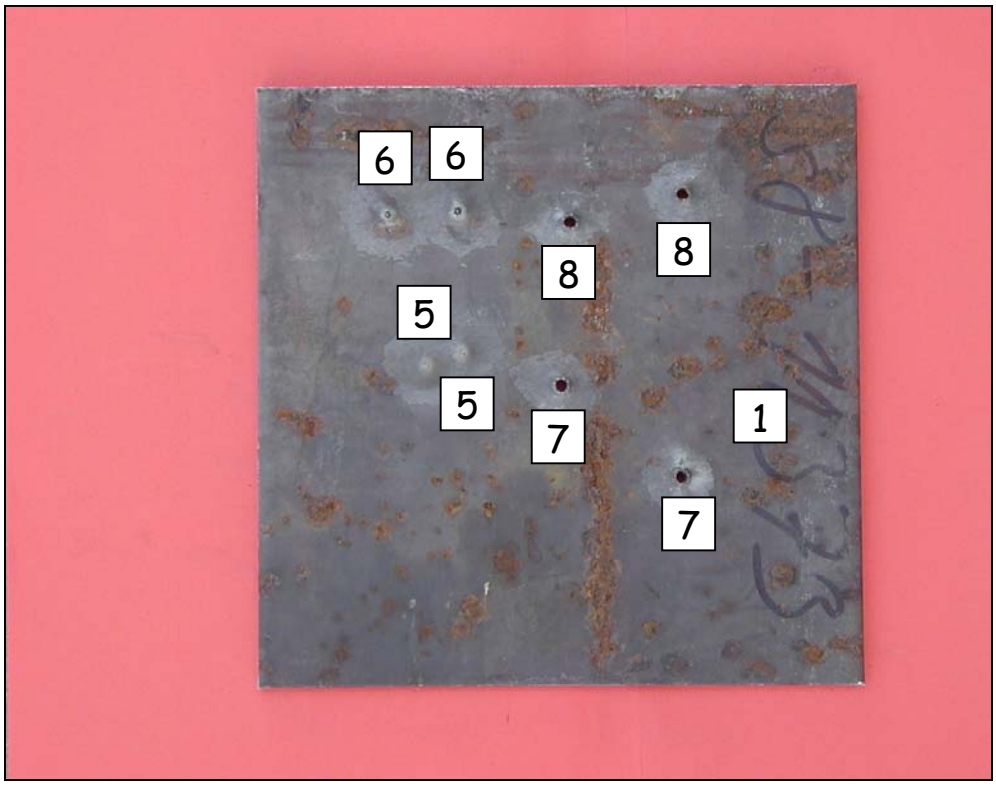


Picture 11 – Steel plate 6 mm, material 11373-75, side of shoot in

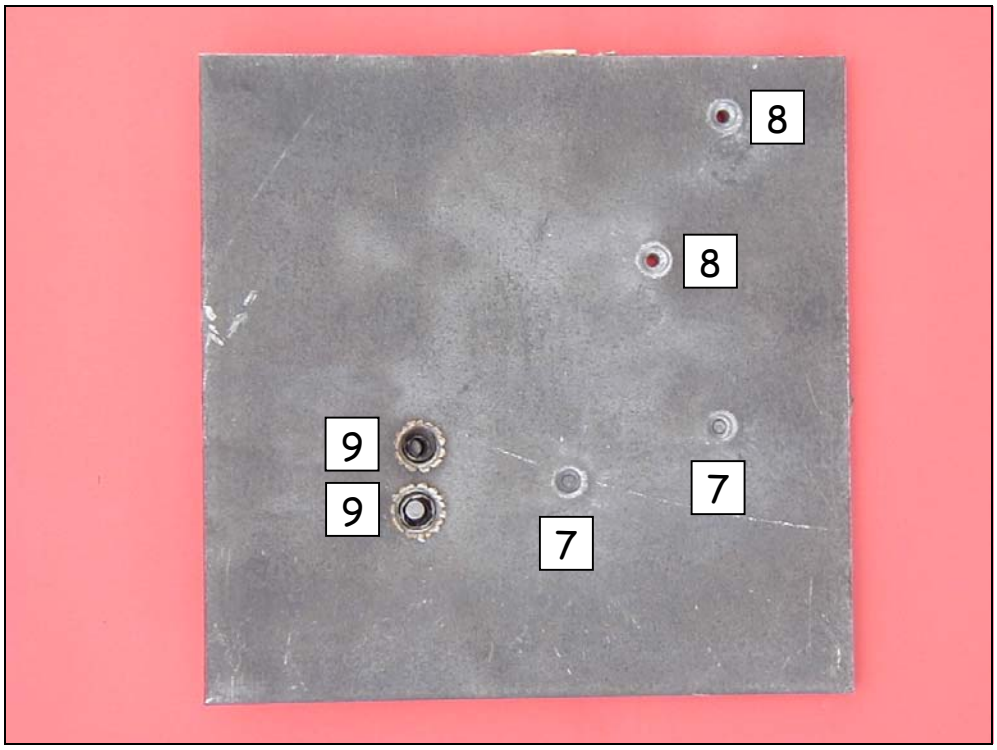


Picture 12 – Steel plate 6 mm, material 11373-75, side of shoot out

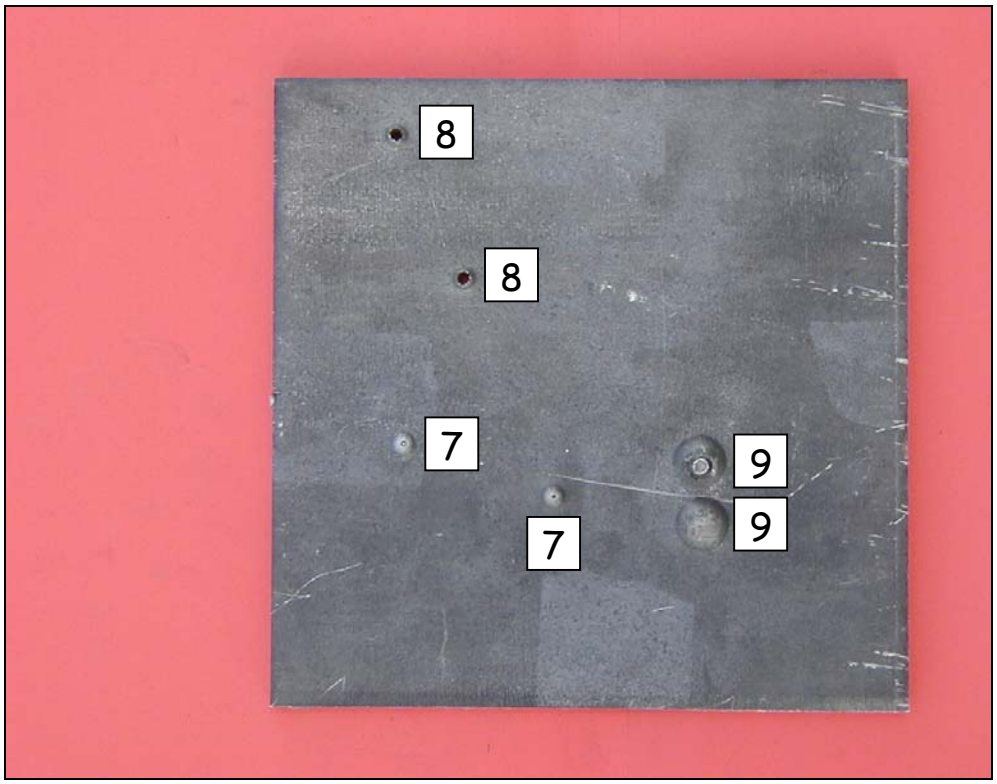
Picture 13 – Steel plate 8 mm, material 11373-75, side of shoot in



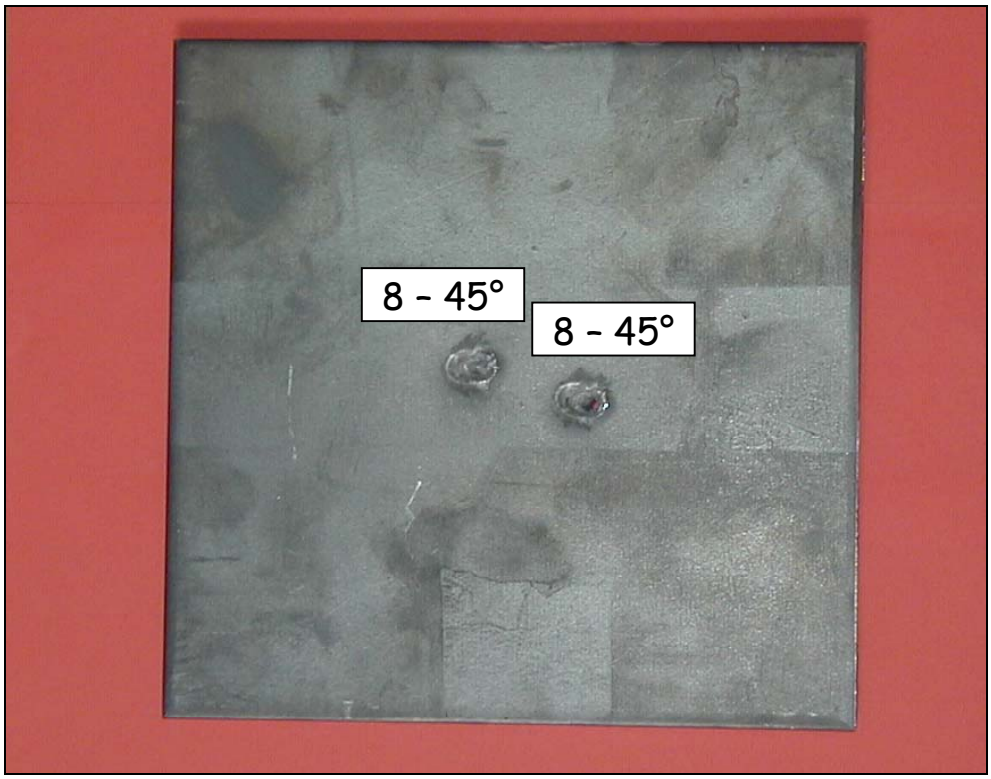
Picture 14 – Steel plate 8 mm, material 11373-75, side of shoot out



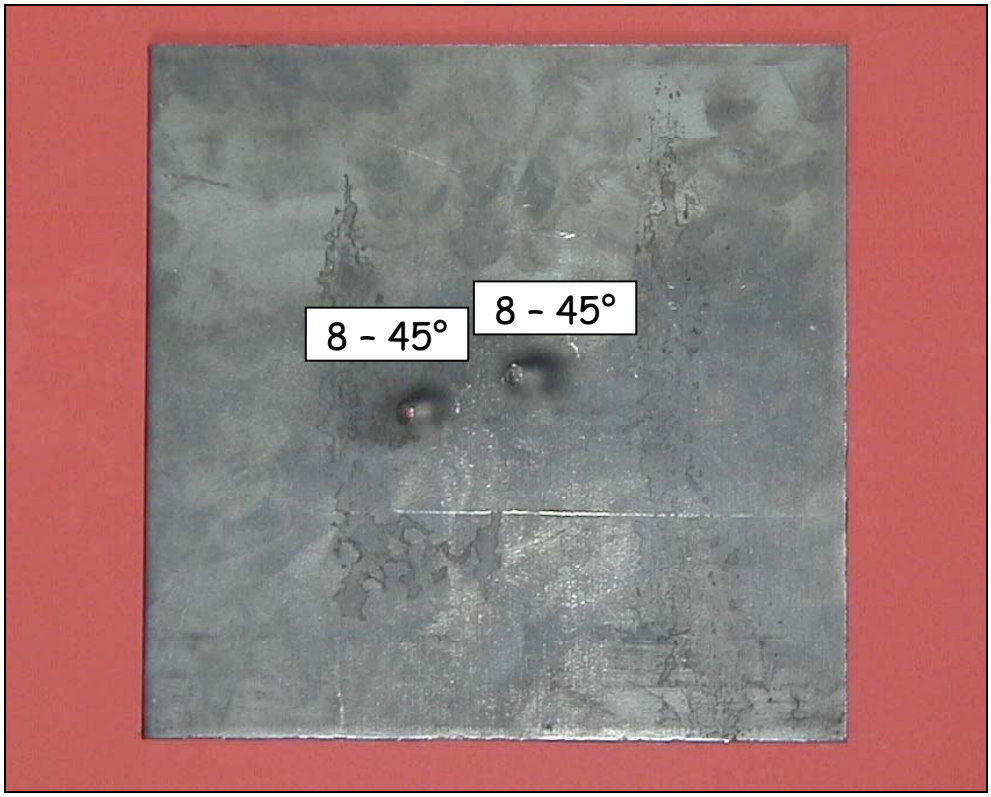
Picture 15 – Steel plate 10 mm, material 11373-75, side of shoot in



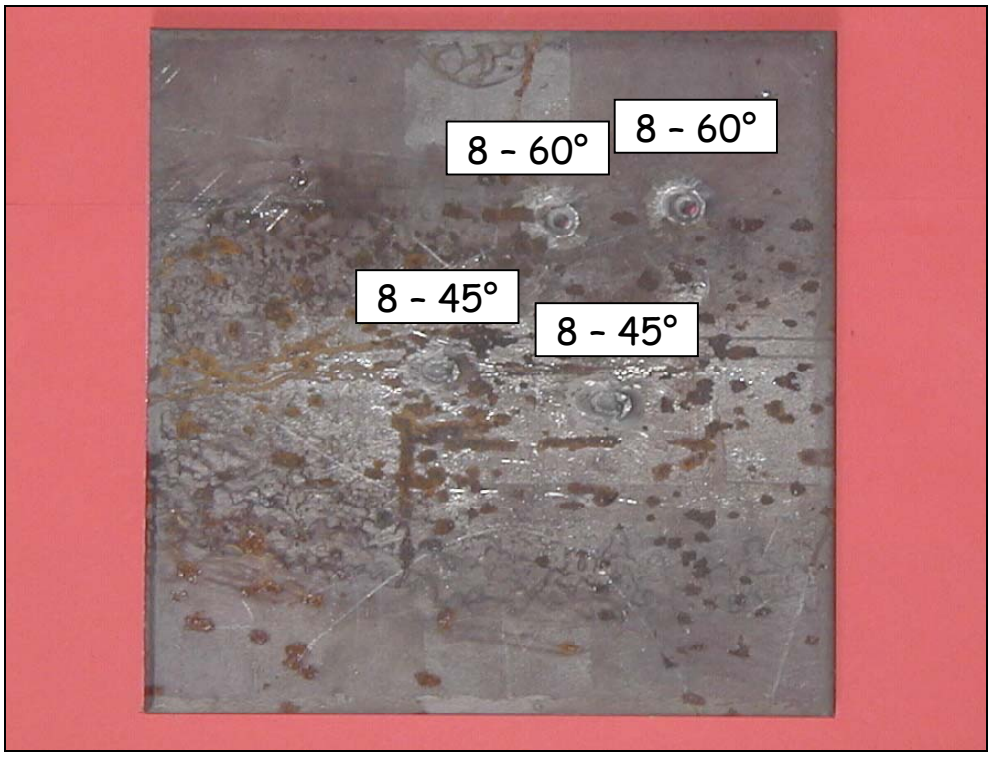
Picture 16 – Steel plate 10 mm, material 11373-75, side of shoot out



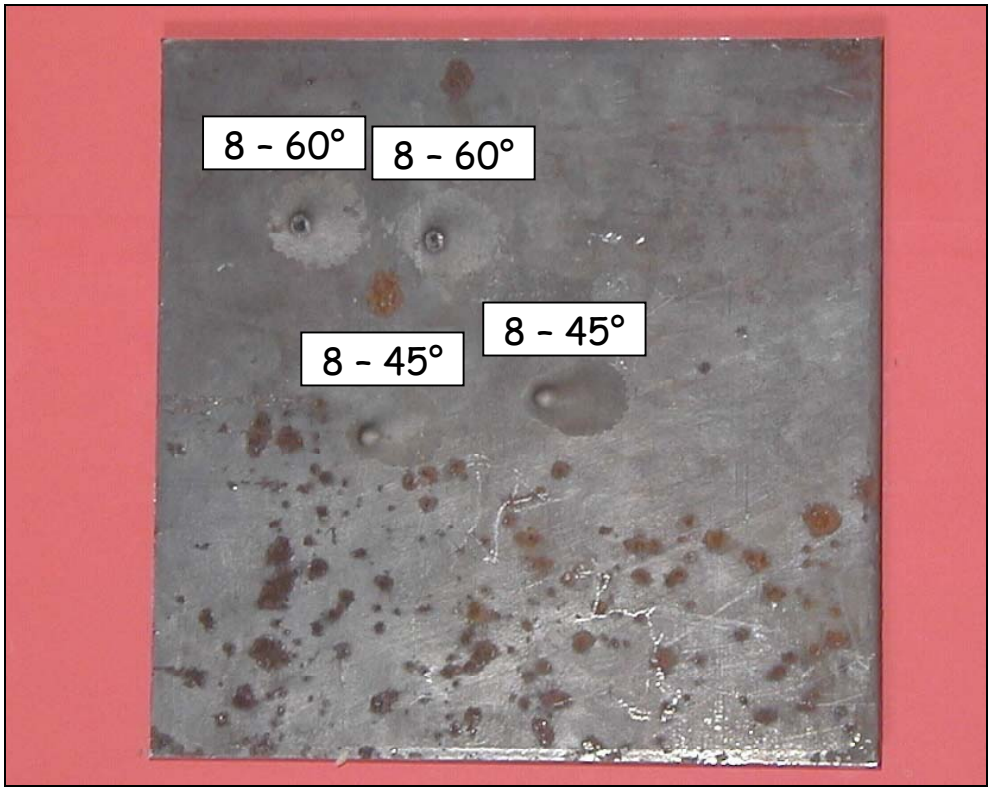
Picture 17 – Steel plate 6 mm, material 11373-75, side of shoot in



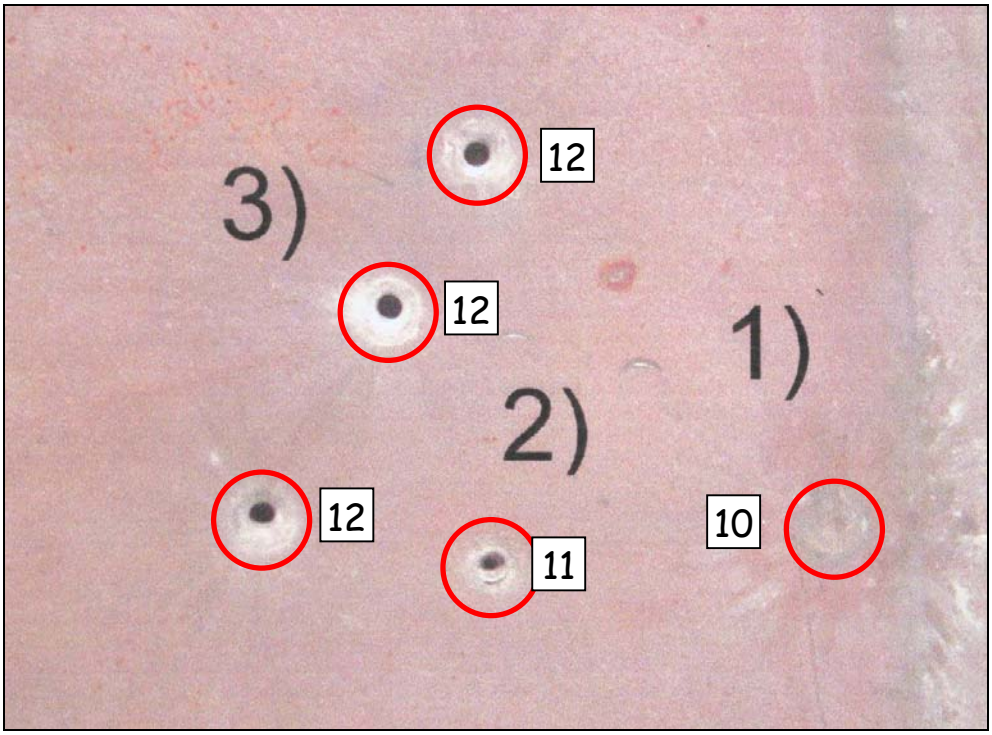
Picture 18 – Steel plate 6 mm, material 11373-75, side of shoot out



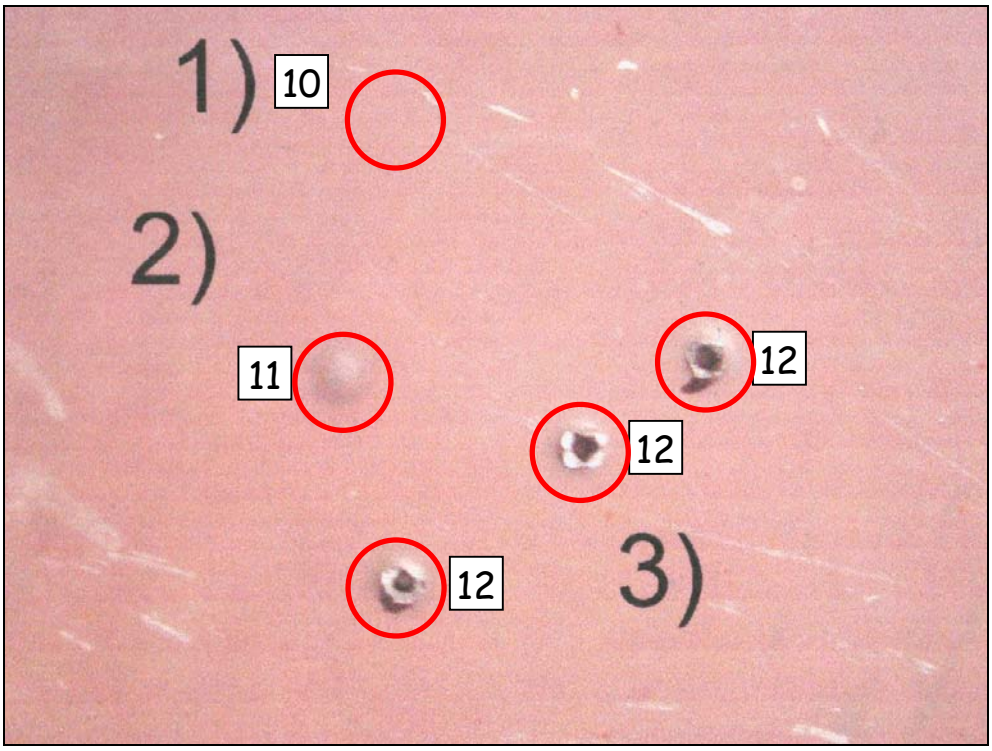
Picture 19 – Steel plate 8 mm, material 11373-75, side of shoot in



Picture 20 – Steel plate 8 mm, material 11373-75, side of shoot out



Picture 21 – Steel plate 5 mm, material HARDOX, side of shoot in

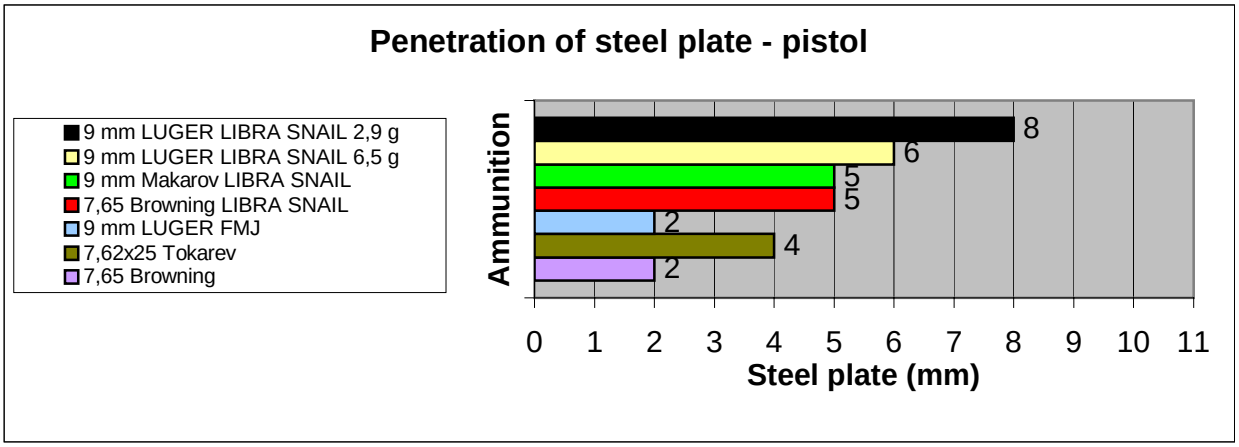


Picture 22 – Steel plate 5 mm, material HARDOX, side of shoot out

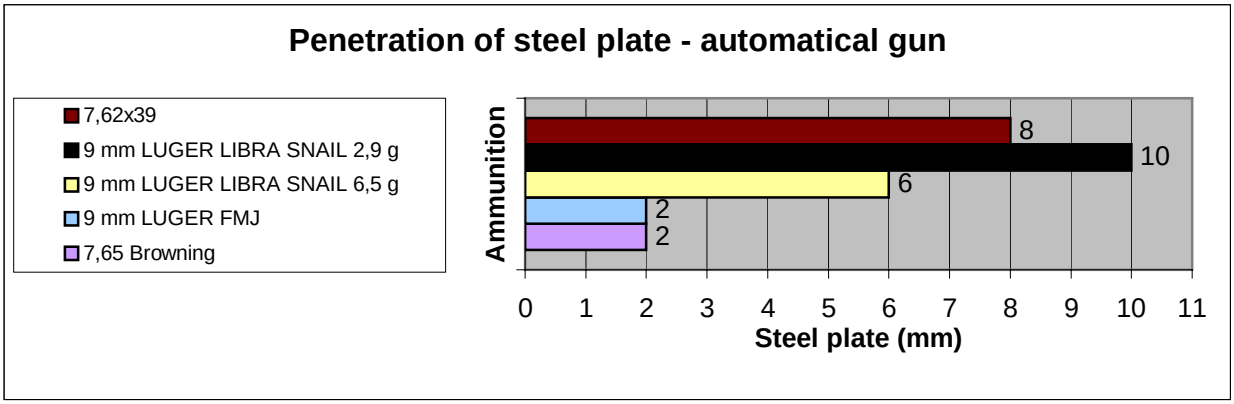
Summary

Nr.	Ammunition	Gun	Steel plate							
			2	3	4	5	6	8	10	HARDOX 5
1	9 mm LUGER	Gun CZ 75	!	x	x	x	x	x	x	x
2	9 mm LUGER	SA HK MP5A5	!	x	x	x	x	x	x	x
3	7,65 Browning	SA CZ vz. 61	!	x	x	x	x	x	x	x
4	7,62x25 Tokarev	Gun CZ vz. 52	!	!	!	x	x	x	x	x
5	9 mm LUGER SNAIL – 6,5 g	Gun CZ 75	!	!	!	!	!	x	x	x
6	9 mm LUGER SNAIL – 6,5 g	SA HK MP5A5	!	!	!	!	!	x	x	x
7	9 mm LUGER SNAIL – 2,9 g	Gun CZ 75	!	!	!	!	!	!	x	!
8	9 mm LUGER SNAIL – 2,9 g	SA HK MP5A5	!	!	!	!	!	!	!	!
9	7,62x39	SA vz. 58	?	?	?	?	?	?	x	?
10	9 mm LUGER (r. 44)	Ballistic barrel	?	?	?	?	?	?	?	x
11	9 mm LUGER SNAIL – 6,5 g	Ballistic barrel	?	?	?	?	?	?	?	x
12	9 mm LUGER SNAIL – 2,9 g	Ballistic barrel	?	?	?	?	?	?	?	!
13	7,65 Br. LIBRA SNAIL	Gun CZ 83	!	!	!	!	?	?	?	?
14	9 mm Mak. LIBRA SNAIL	Gun CZ 82	!	!	!	!	?	?	?	?

Table 2 **!** – shoot through, x – shoot not through, ? – was not tested



Graph 1 – Penetration of steel plate – pistol



Graph 2 – Penetration of steel plate – automatical gun

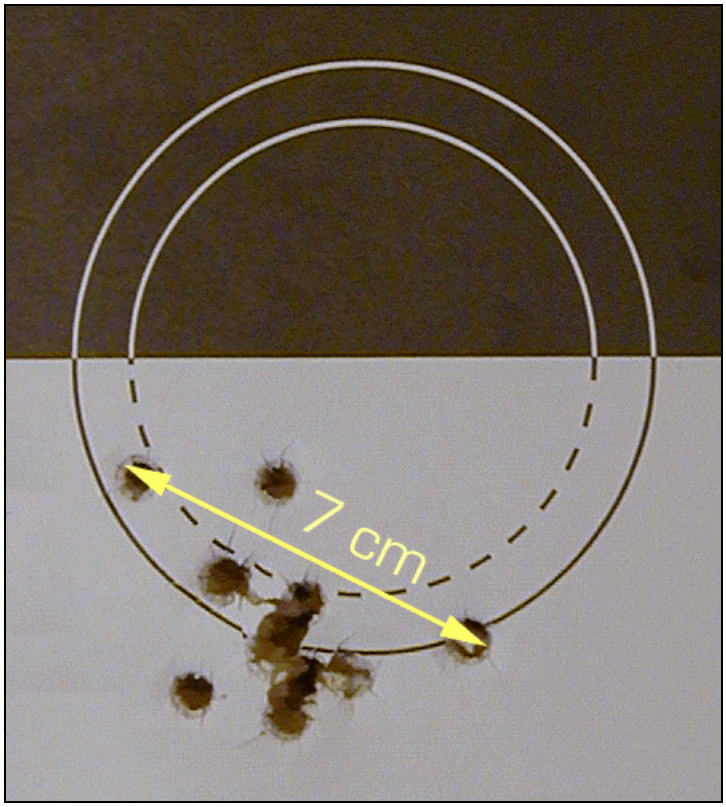
9 mm LUGER LIBRA SNAIL - Ballistic barrel - Gun

Nr.	Velocity	Energy	Pressure/Pieso
1	763,78	845,88	306,46
2	758,34	833,87	305,23
3	773,11	866,67	327,51
4	762,74	843,56	313,56
5	725,13	762,43	233,52
6	760,65	838,95	308,42
7	751,95	819,88	292,75
8	759,03	835,39	297,89
9	736,13	785,73	273,66
10	769,31	858,16	316,74
Average	**756,02**	**829,05**	**297,57**
Max	**773,11**	**866,67**	**327,51**
Min	**725,13**	**762,43**	**233,52**

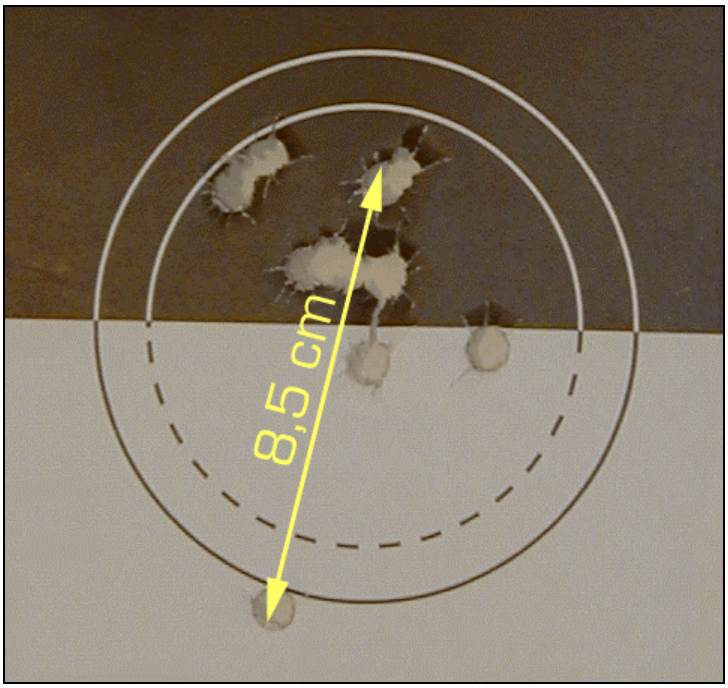
Table 3 - 9 mm LUGER LIBRA SNAIL - Ballistic barrel - Gun - Velocity, Energy, Pressure

9 mm LUGER LIBRA SNAIL - Ballistic barrel - Auto. Gun			
Nr.	**Velocity**	**Energy**	**Pressure/Pieso**
1	811,24	954,27	-
2	813,22	958,93	-
3	844,39	1033,85	-
4	843,68	1032,11	-
5	846,11	1038,05	-
Average	**831,73**	**1003,44**	**-**
Max	**846,11**	**1038,05**	**-**
Min	**811,24**	**954,27**	**-**

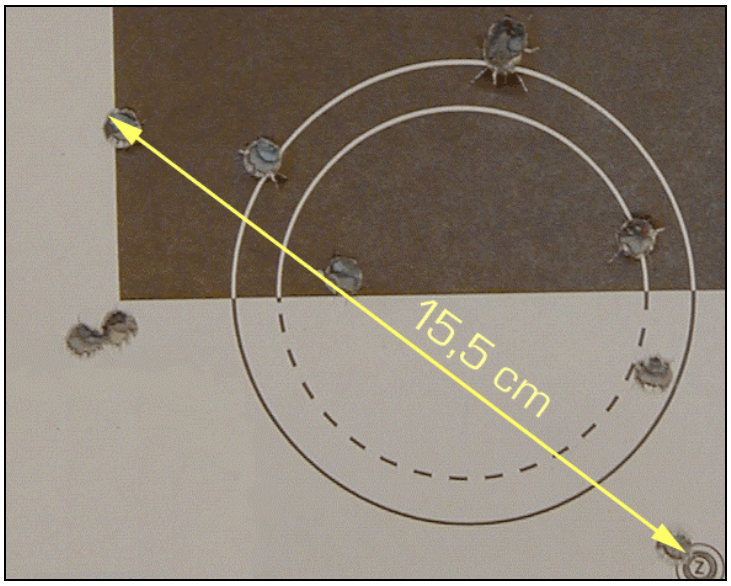
Table 4 - 9 mm LUGER LIBRA SNAIL - Ballistic barrel - Auto. Gun - Velocity, Energy



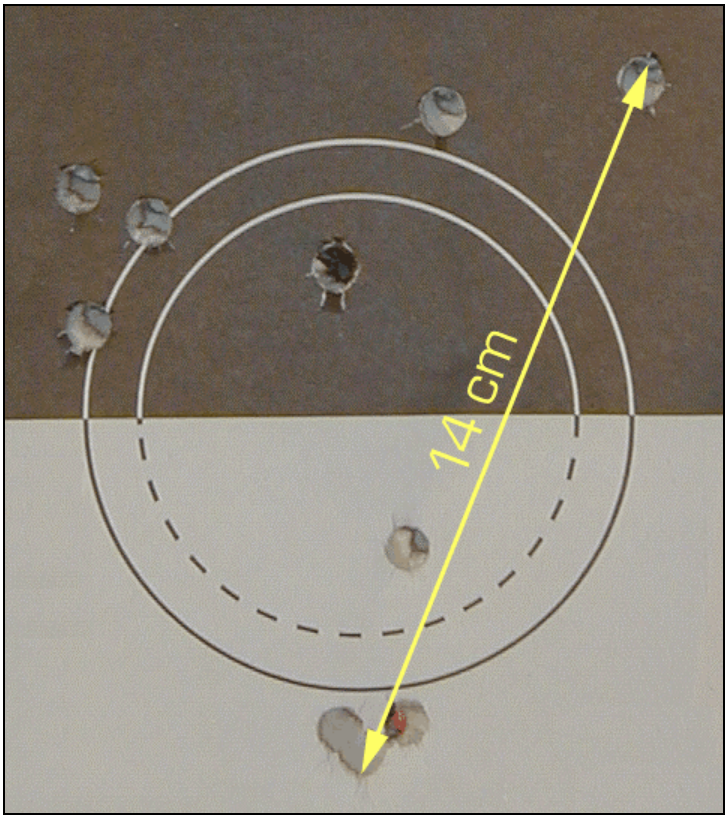
Picture 23 - Dispersion of 10 shoots of 9 mm LUGER LIBRA SNAIL 6,5g, ballistic barrel - gun, distance - 25m



Picture 24 - Dispersion of 10 shoots of 9 mm LUGER LIBRA SNAIL 6,5g, ballistic barrel - auto. gun, distance 25m



Picture 25 - Dispersion of 10 shoots of 9 mm LUGER LIBRA SNAIL 2,9g, ballistic barrel - gun, distance 25m



Picture 26 - Dispersion of 10 shoots of 9 mm LUGER LIBRA SNAIL 2,9g, ballistic barrel - auto. gun, distance 25m

Picture 27 – Protective jacket - type TBO 2 (?) resistance 2 (?), bolstered by 1,5 cm felt (8x folded)

Picture 28 – Three hits of 9 mm LUGER LIBRA SNAIL 6,5 g to area of double layer of jacket (bullets were stopped in the 2nd part of layer, only steel cores juted in approximately 3-4 mm)

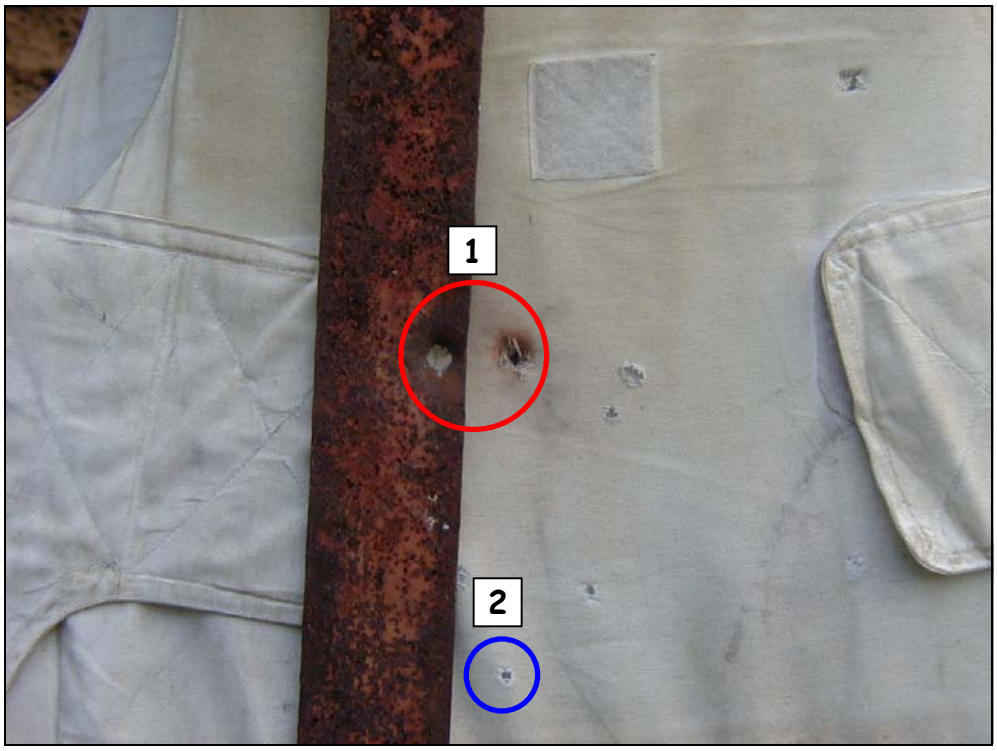
Picture 29 – One hit of 9 mm LUGER LIBRA SNAIL 6,5 g above doubled layer of protective jacket (bullet went through to back part of jacket)

Picture 30 – View on penetration of protective jacket above double layer

Picture 31 – Hit of 9 mm LUGER LIBRA SNAIL 2,9 g to area of double part of jacket (jacket penetrated)

Picture 32 – Test of resistance of protective jacket behind steel obstackle of width 2 - 3 mm (random belt of steel plate)

Picture 33 – Test of resistance of protective jacket behind steel obstackle of width 2 - 3 mm (random belt of steel plate)

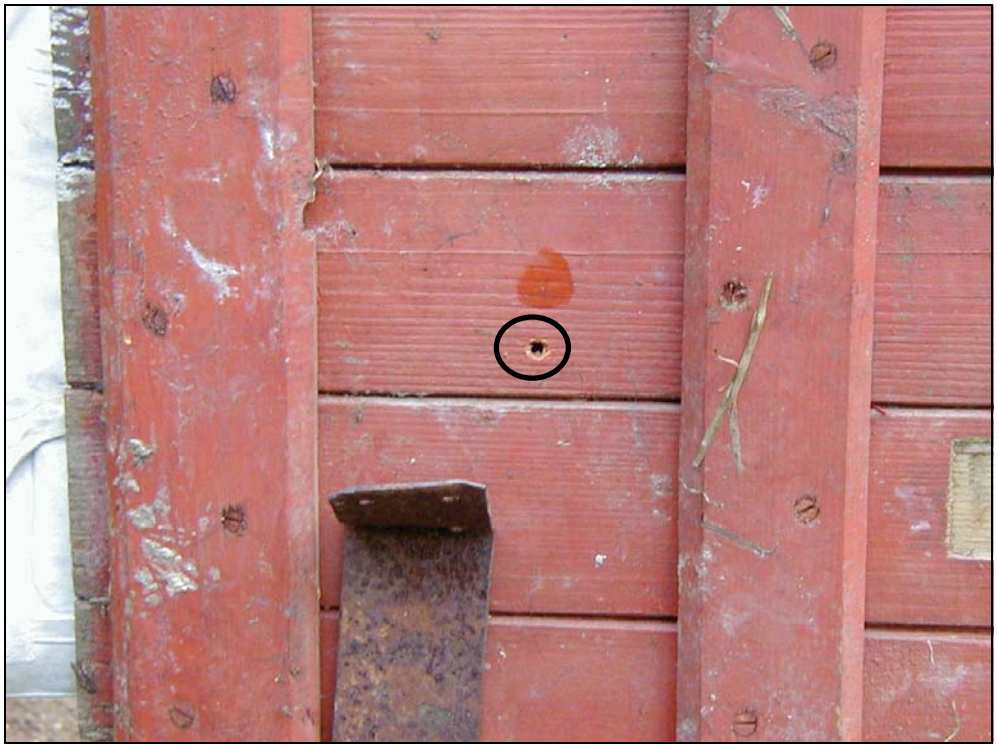


Picture 34 – 1. Hit of 9 mm LUGER LIBRA SNAIL 2,9 g (steel plate as well as jacket penetrated – steel core of bullets penetrates even back part of jacket), 2. Hit of 9 mm LUGER FMJ S&B (bullet was stopped in 1st layer of protective jacket)

Picture 35 – View on penetration from back side of jacket

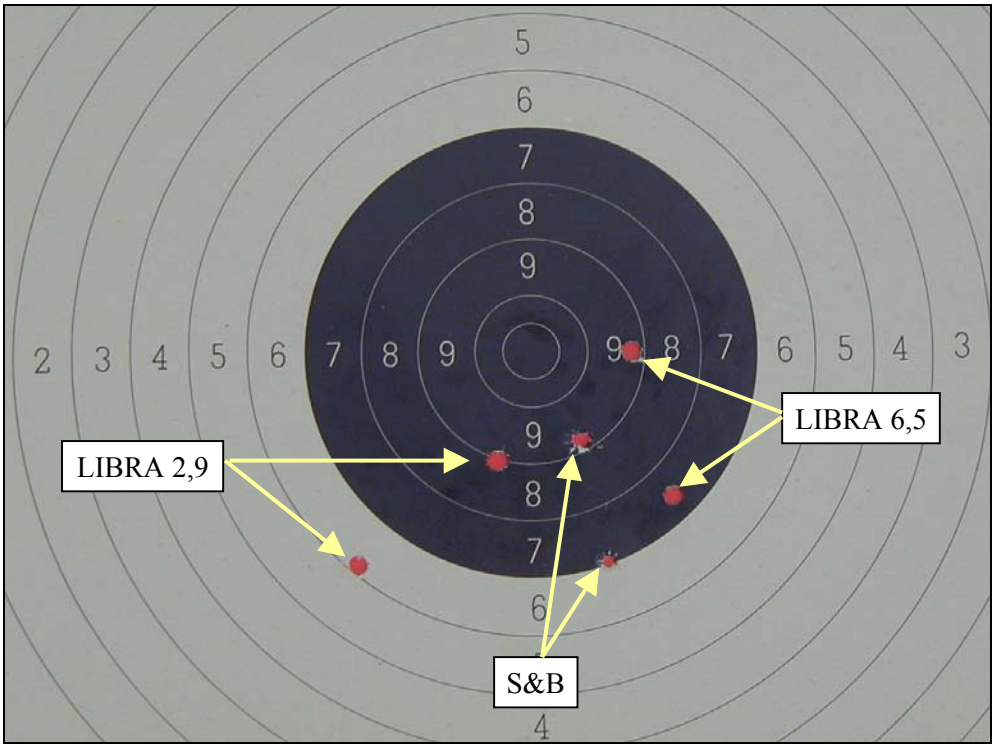
Picture 36 – Hit of obstacle by 9 mm LUGER FMJ S&B (bullet did not penetrate steel plate and bullet was destroyed, on protective jacket there is only trace of rast from back side of plate)

Picture 37 – Test of resistance of protective jacket behind wooden obstacle of width 1,5 cm (random piece of wood)



Picture 38 – Hit by 9 mm LUGER LIBRA SNAIL 2,9 g

Picture 39 – Penetration of front part of protective jacket and penetration of wooden desk, on which jacket was hung



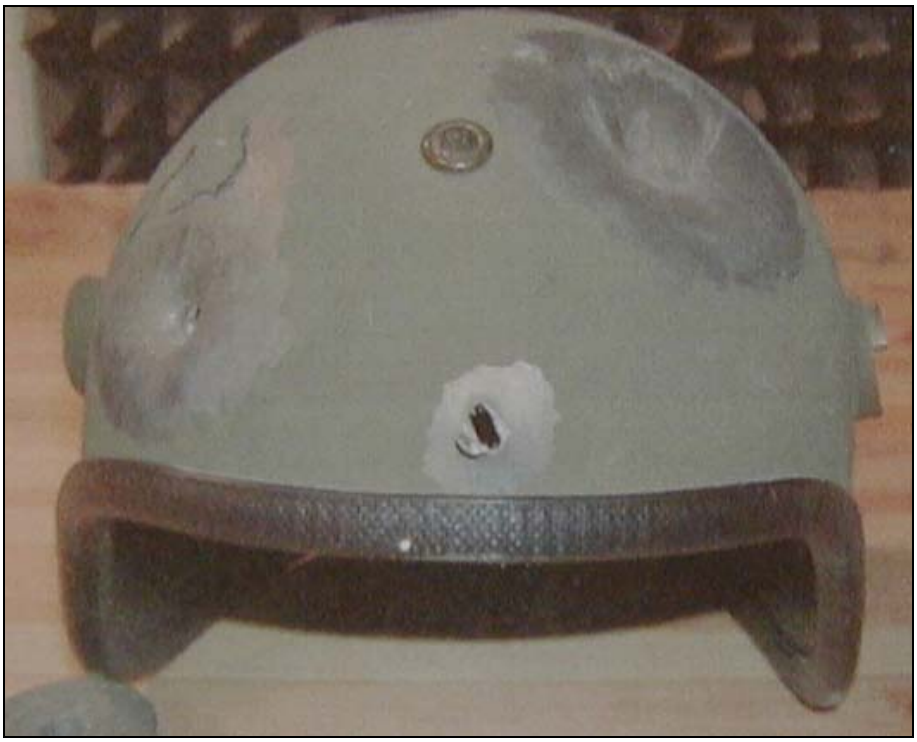
Picture 40 – Group of two one after one quickly shooted cartridges by policeman from gun ČZ 75 on distance7 m

Picture 41 - Copy of article printed in magazin Střelecká revue 9/2002, page 20, translation see bellow

Helmets

Helmets for special police units are usually produced from laminates fixed by carbon fibres. Austrian company Ulbrichts GmbH presented a new helmet from titan last year, which together with transparent face-cover weighs 2,7 kg. Titan helmet resists bullets caliber 357 Magnum, face-cover resists several hits by bullet 9 mm LUGER (NATO).

Picture 42 - Titan helmet resistant against bullet 9mm LUGER (CP/Pbj - 8,0 g) and 7,62x25 Tokarev (CP/Pbj - 5,5g) - penetrated by 9mm LUGER LIBRA SNAIL - side of shoot in



Picture 43 - Titan helmet resistant against bullet 9mm LUGER (CP/Pbj - 8,0 g) and 7,62x25 Tokarev (CP/Pbj - 5,5g) - penetrated by 9mm LUGER LIBRA SNAIL - side of shoot out

Picture 44 - Protective cevral jacket with metal wadding with resistance 4 CZ (7,62x25 Tokarev Fej - steel core) - penetrated by 9mm LUGER LIBRA SNAIL Side of shoot in

Picture 45 - Protective cevral jacket with metal wadding with resistance 4 CZ (7,62x25 Tokarev Fej - steel core) - penetrated by 9mm LUGER LIBRA SNAIL Side of shoot out

Picture 46 - Penetration of 46 layers of material Goldflex by 9 mm LUGER LIBRA SNAIL

Picture 47 - Effect of 9mm LUGER LIBRA SNAIL (no penetration) in ceramic shield 14 mm of resistance TBO 7

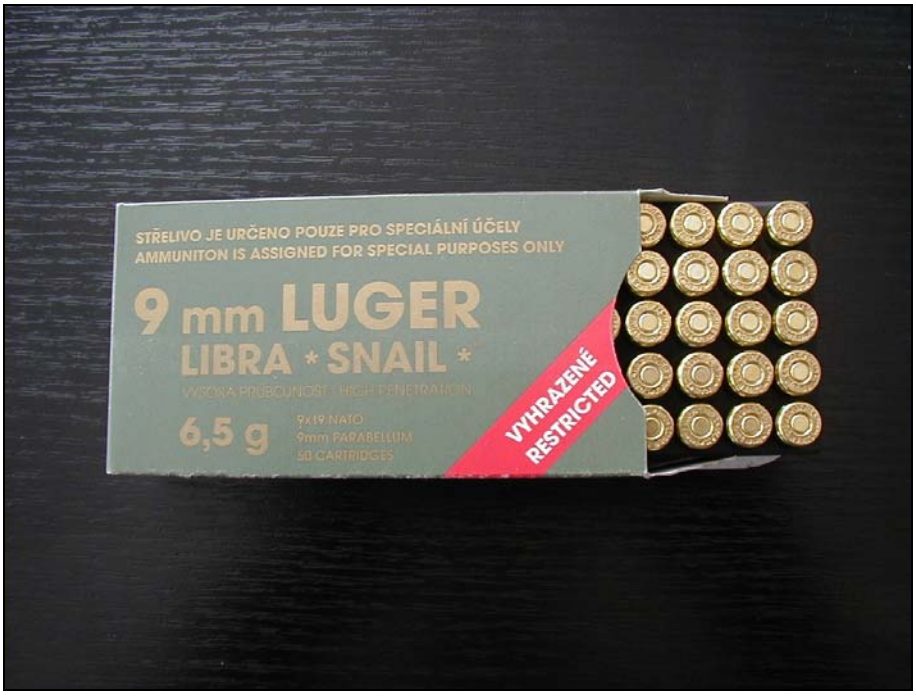
Picture 48 - Steel plate 5 mm penetrated by 7,65 Browning LIBRA SNAIL (bullet weight 2g) - red colored, 7,62x25 Tokarev FMJ steel core white colored (not penetrated), 9 mm LUGER LIBRA SNAIL 6,5 g blue colored

Picture 49 - 7,65 Browning LIBRA SNAIL, 9 mm LUGER LIBRA SNAIL

Picture 50 - Steel plate 5 mm - comparing efect of 9 mm Makarov lead core S&B, 9 mm Makarov steel core (Russian) and 9 mm Makarov LIBRA SNAIL

Picture 51 - 9 mm LUGER LIBRA SNAIL 2,9 g - different color design

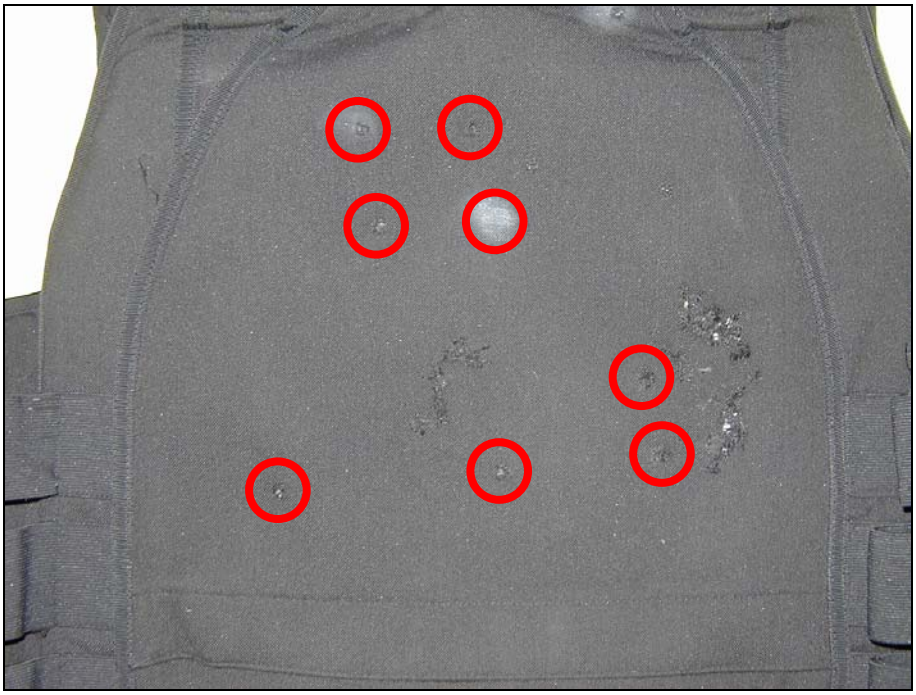
Picture 52 - Packing of ammunition 9 mm LUGER LIBRA SNAIL - 2,9 g



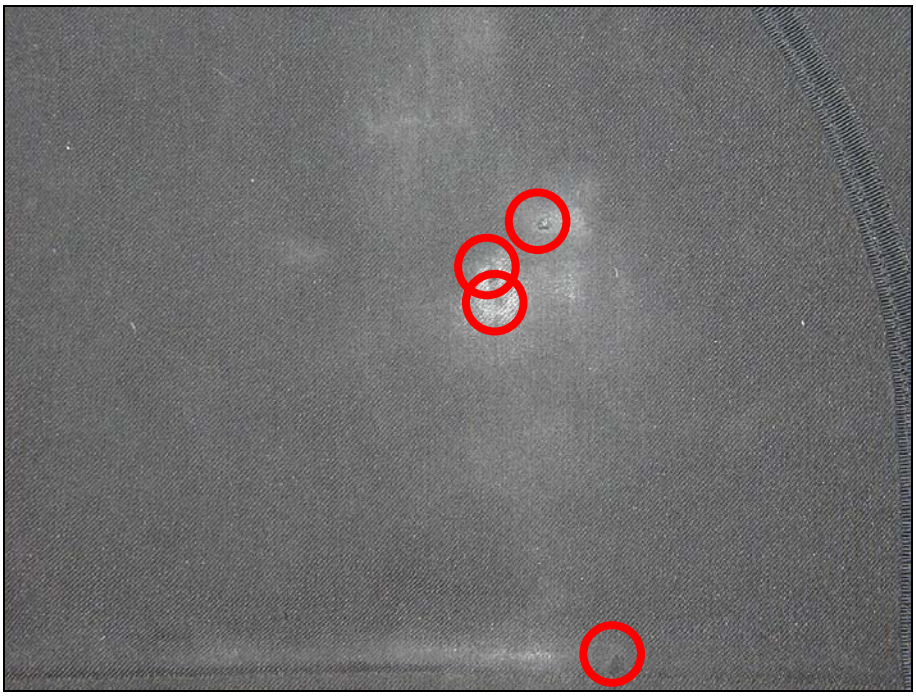
Picture 53 - Packing of ammunition 9 mm LUGER LIBRA SNAIL - 6,5 g

Picture 54 - Packing of ammunition 9 mm LUGER LIBRA SNAIL - 2,9 g

Picture 55 - Packing of ammunition 9 mm LUGER LIBRA SNAIL - 6,5 g



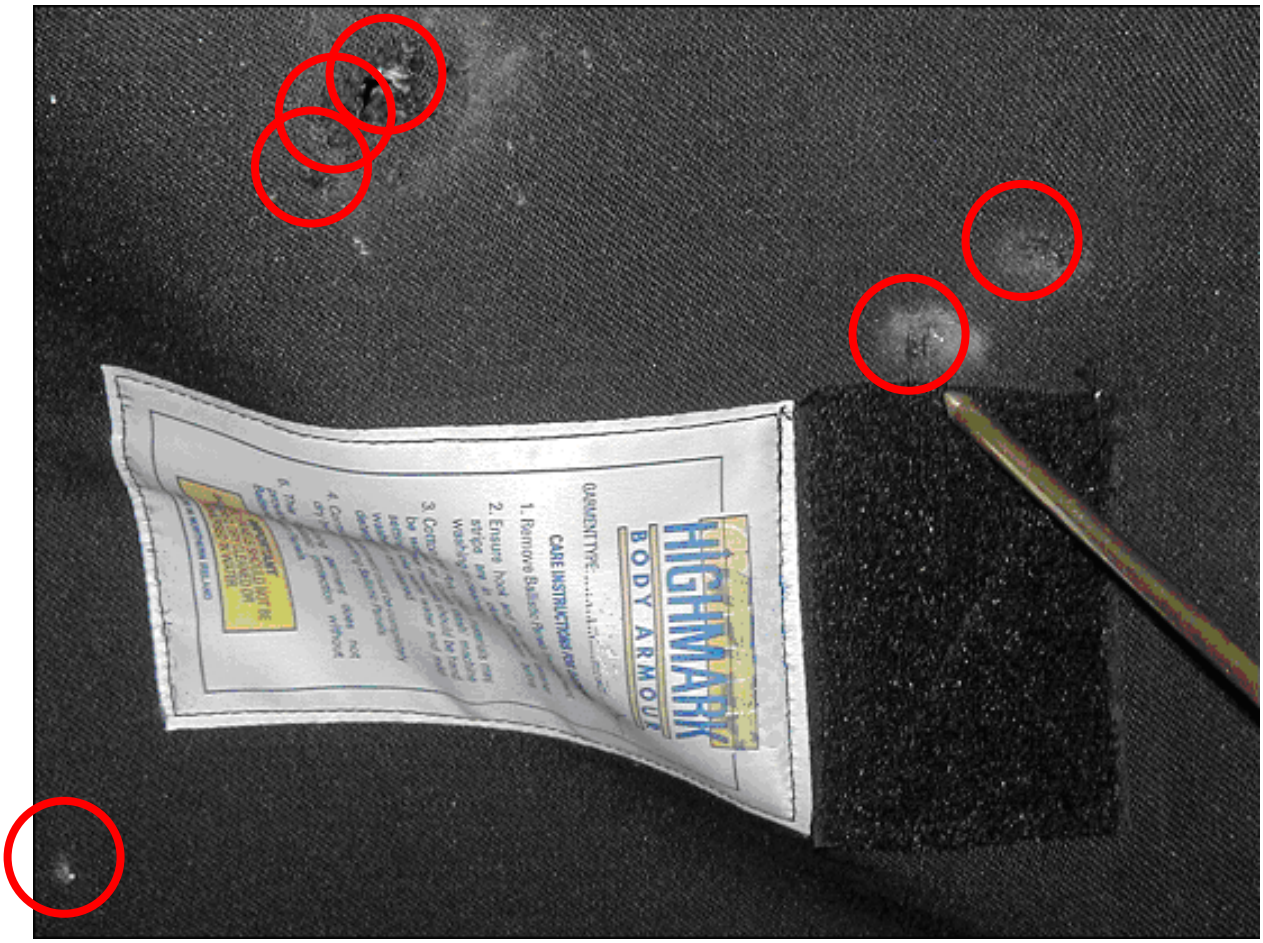
Picture 56 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g - side of shoot in



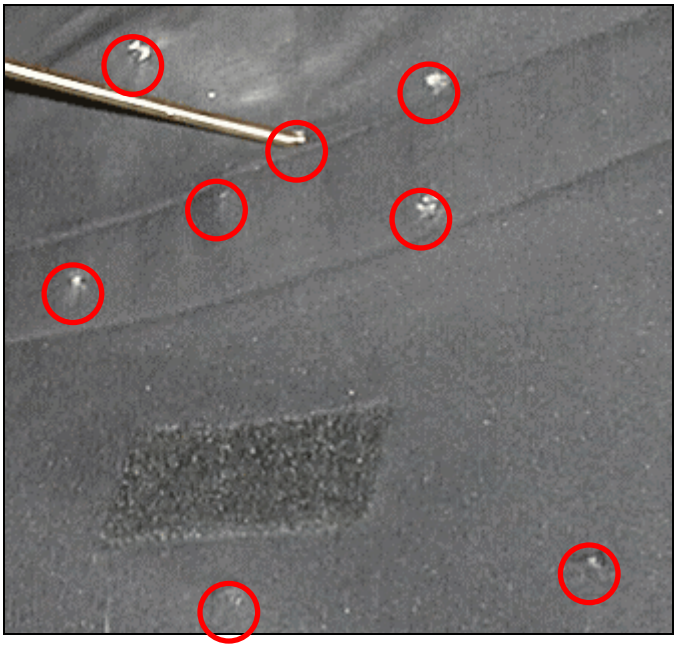
Picture 57 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g - side of shoot out

Picture 58 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g

Picture 59 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g



Picture 60 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g - back inner side



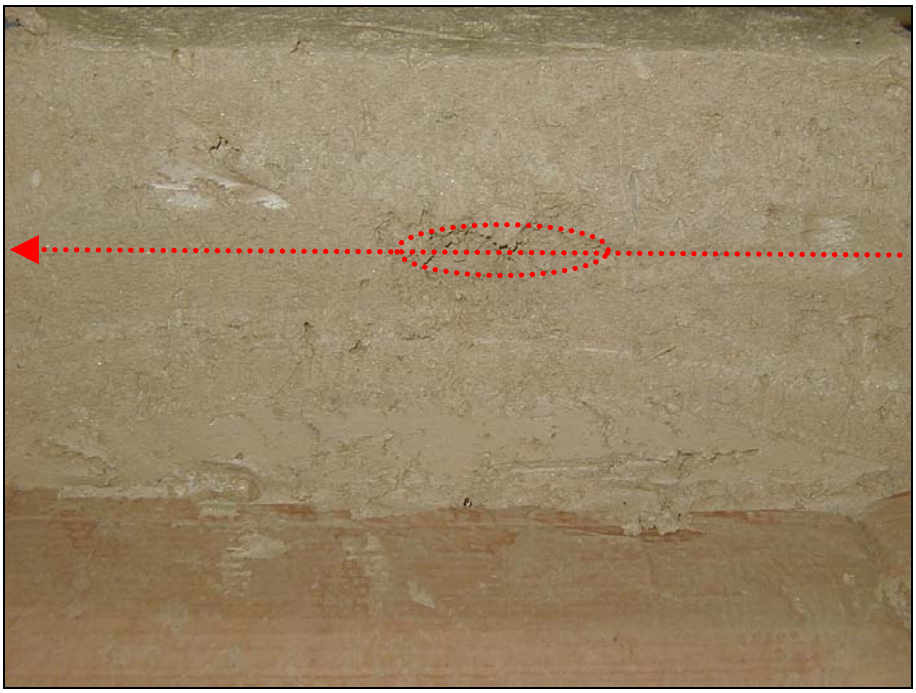
Picture 61 - Penetration of special operations jacket HighMark, protection level - Mark III by 9 mm LUGER LIBRA SNAIL 2,9 g - front inner side

Picture 62 - Penetration of ceramic heart protection shield by 9 mm LUGER LIBRA SNAIL 2,9 g

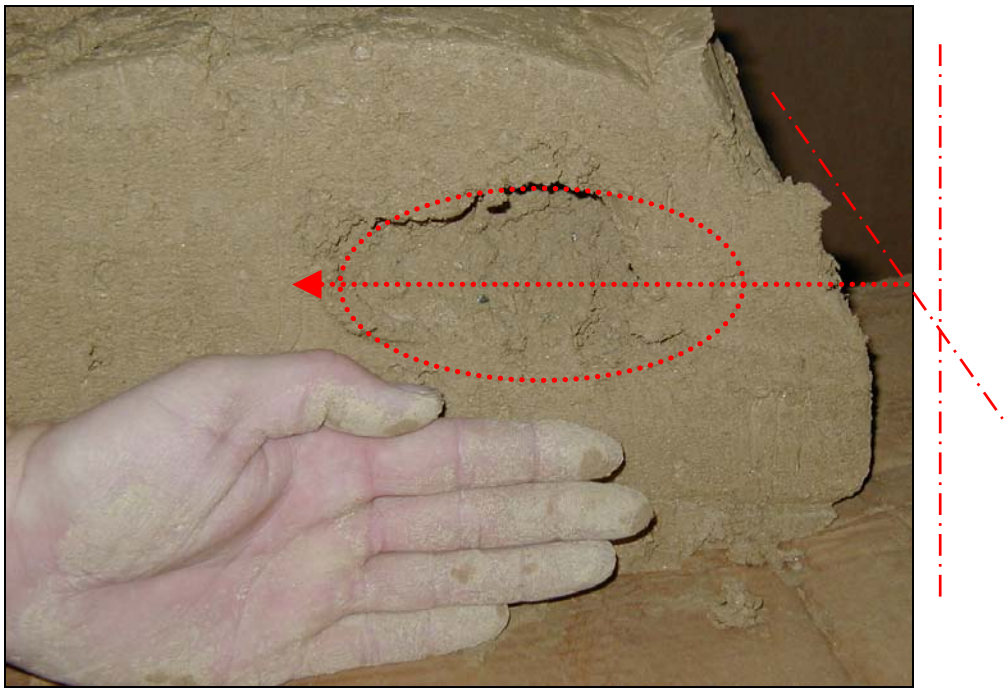
Picture 63 - Detail of penetration of ceramic heart protection shield by 9 mm LUGER LIBRA SNAIL 2,9 g - double hit

Picture 64 - Penetration of ceramic heart protection shield by 9 mm LUGER LIBRA SNAIL 2,9 g

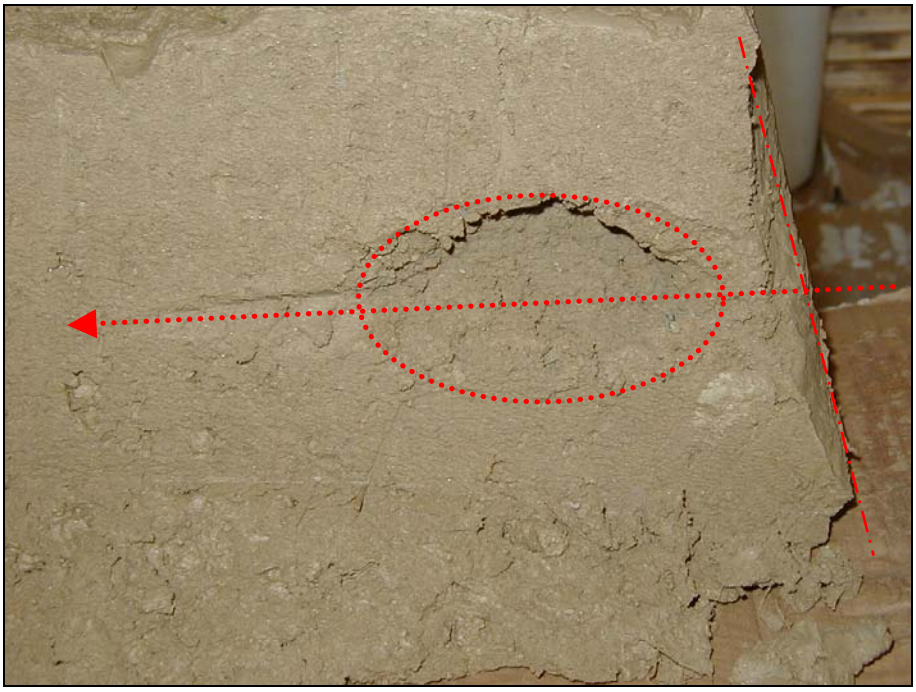
Picture 65 - Detail of penetration of ceramic heart protection shield by 9 mm LUGER LIBRA SNAIL 2,9 g - double hit



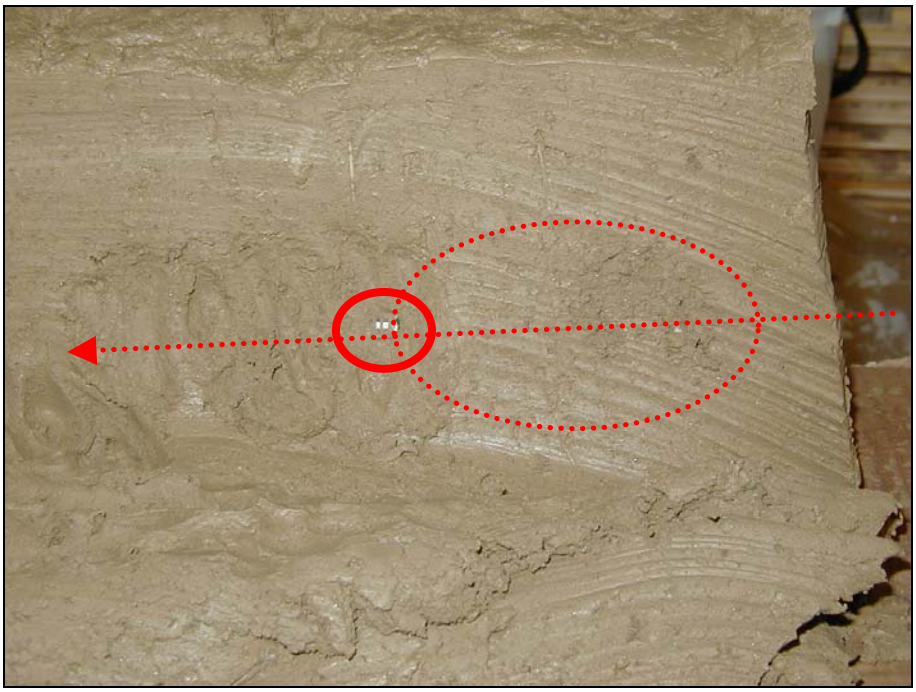
Picture 66 - Penetration of clay block by 9 mm LUGER S&B - block penetrated (gun - CZ 75)



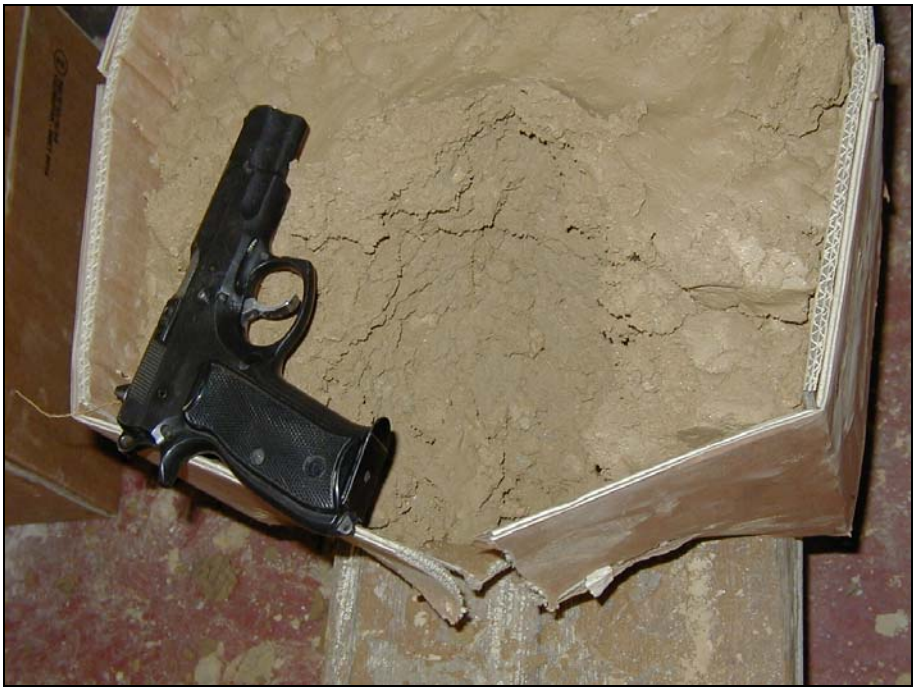
Picture 67 - Efect of penetration of clay block by 9 mm LUGER LIBRA SNAIL 2,9 g (gun - CZ 75)



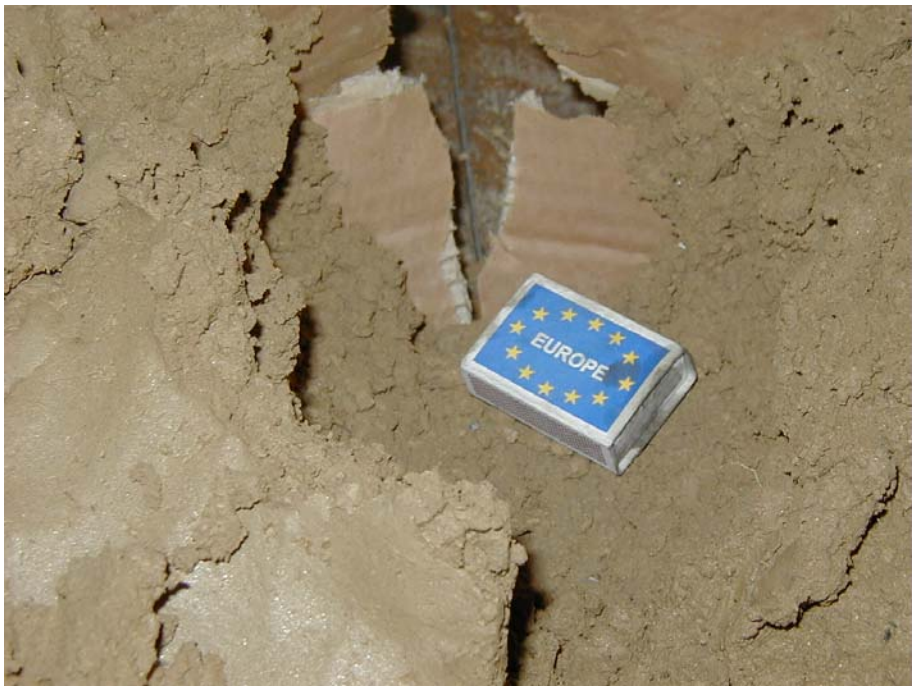
Picture 68 - Efect of penetration of clay block by 9 mm LUGER LIBRA SNAIL 6,5 g (gun - CZ 75)



Picture 69 - Cut of clay block penetrated by 9 mm LUGER LIBRA SNAIL 6,5 - position of bullet (gun - CZ 75)

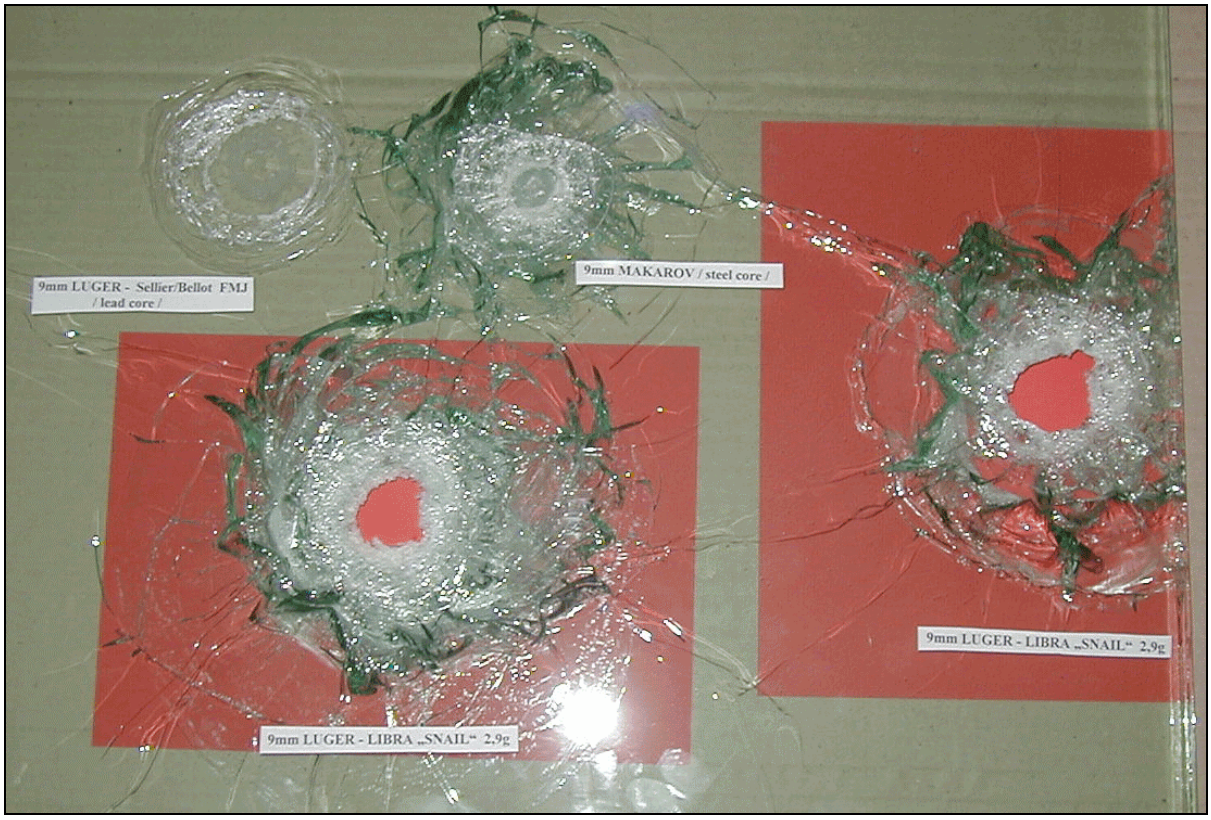


Picture 70 - Efect of penetration of clay block by 9 mm LUGER LIBRA SNAIL - view from top (gun - CZ 75)



Picture 71 - Efect of penetration of clay block by 9 mm LUGER LIBRA SNAIL - detail (gun - CZ 75)

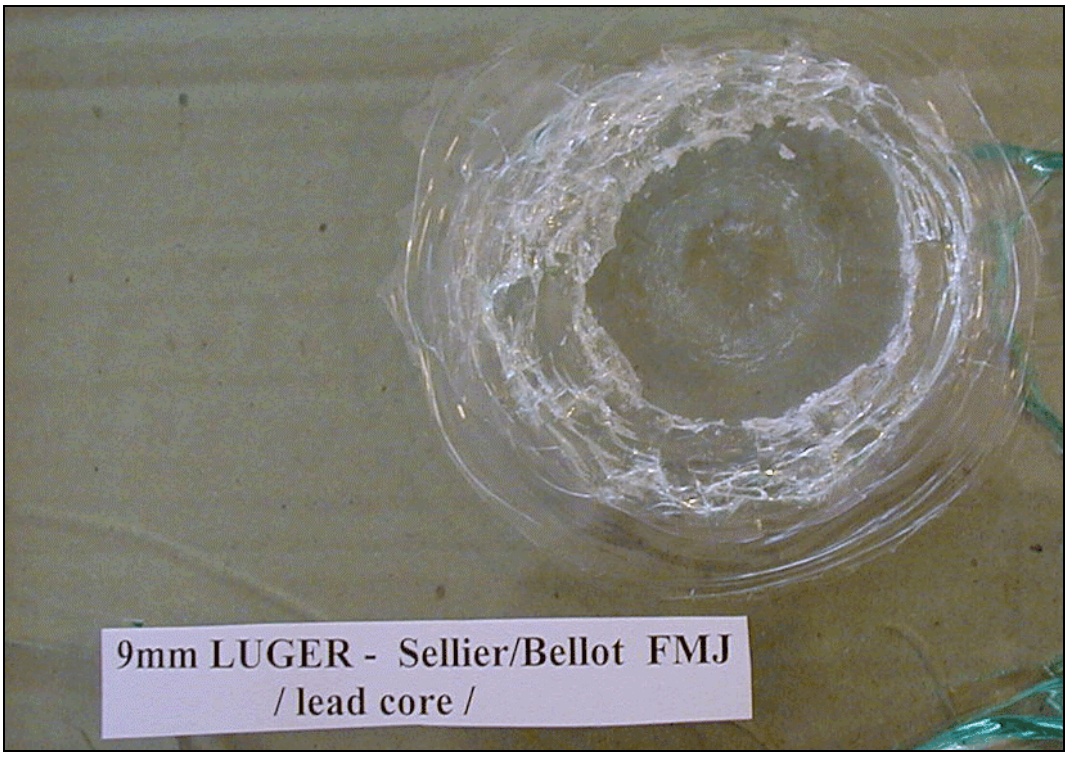
Picture 72 - Bank glass and cartridge 9mm LUGER FMJ



Picture 73 - Four hits of bank glass

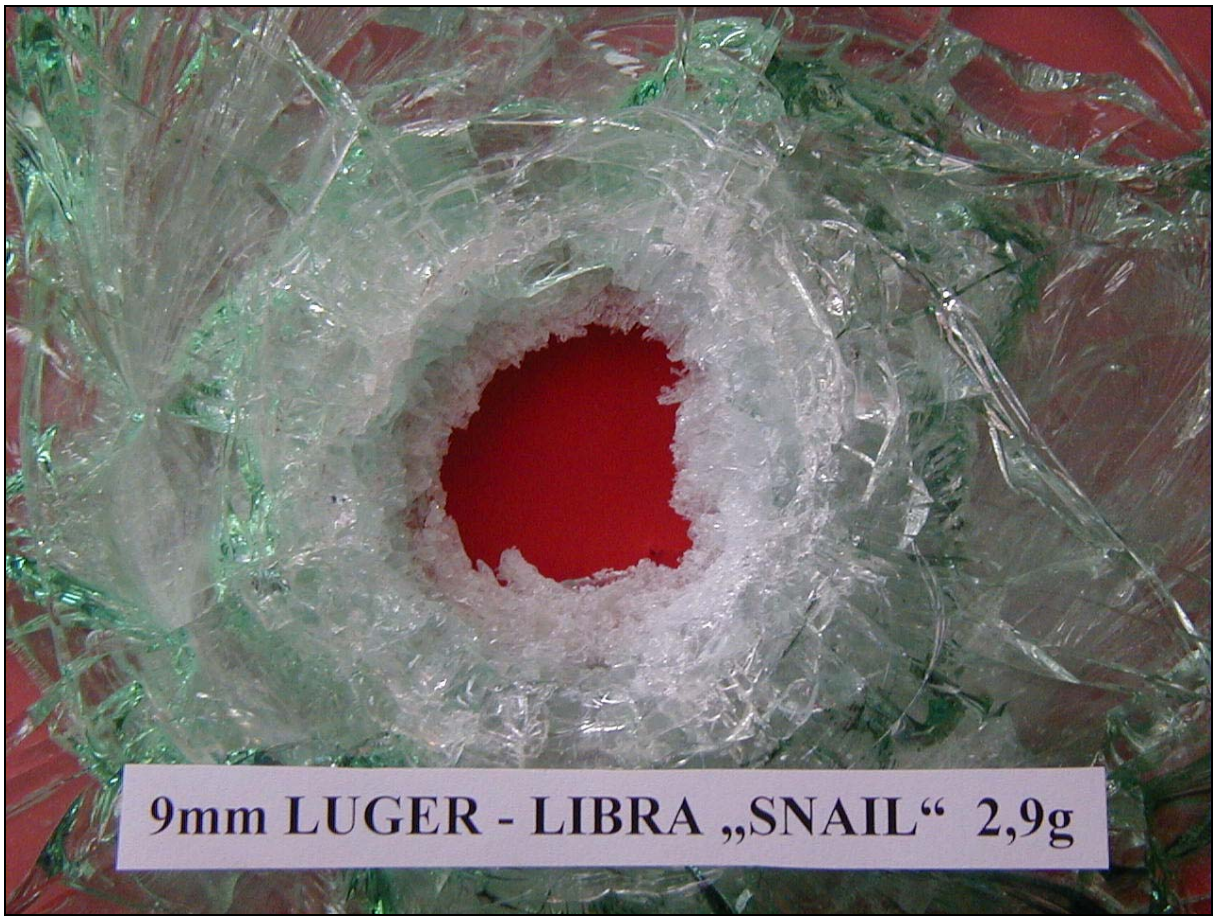
Picture 74 - Penetration of bank glass

Picture 75 - Penetration of bank glass



Picture 76 - Gun CZ 75, distance 5 m

Picture 77 - Gun CZ 82, distance 5 m



Picture 78 - Gun CZ 75, distance 5 m

Picture 79 - Gun CZ 75, distance 5 m