NGIC Assessment

(U//FOUO) Iraq: Proximity Fuzes Found on 107-mm Rockets

(U) Purpose

(U) This assessment provides information on insurgent use of proximity fuzes with 107-mm rockets and its significance to Coalition forces.

(U) Key Points

- (S//REL TO USA, MCFI) Weapons Intelligence Teams (WIT) and Explosive Ordnance Disposal (EOD) teams discovered 107-mm rockets with proximity fuzes following a raid on 16 February 2006.
- (U//FOUO) This is the first confirmed instance of proximity fuzes being correctly associated (intentionally or otherwise) with the 107-mm rocket in either Iraq or Afghanistan.
- (U//FOUO) Proximity fuzes can significantly increase the effective area of 107-mm HE-Frag rockets.
- (U//FOUO) It is not known if the insurgents were aware of the fuze types or were simply using what was available.
- (U//FOUO) An MD-21 does not require manipulation by the user in order to function in the proximity mode and thus increases the rocket's effective area.

(U) Significant Cache Item Found

(S//REL TO USA, MCFI) On 16 Feb 2006 Coalition forces discovered a weapons cache at a house located near the intersection of RTE Northstars and RTE Cannucks (38S MB 10569 98193; the WIT report indicated that there was no known city within 6 km of the location). Among the ordnance discovered in the cache were five 107-mm artillery rockets. At least three of these rockets were fuzed with a fuze not previously seen mated to 107-mm rockets in Iraq. These fuzes have been identified as Chinese MD-21 RF proximity fuzes. The MD-21 fuze is produced with a green plastic cover on the nose, but in this case the covers were removed. The absence of this plastic cover is not expected to affect the ability of the fuze to function as designed.

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(U) Rockets Found in Cache

(U) Rocket Background

(U//FOUO) The 107-mm rocket is one of the most commonly encountered indirect-fire weapons in Iraq and Afghanistan. The unique finless, thrust-induced-spin stabilized design gives them the ability to be fired in an improvised manner without a conventional launch platform. At approximately 18 kg (~40 lbs) and less than 1 meter in length, the rockets are easily transported and concealed. While a variety of warheads are produced worldwide, those encountered in Iraq are almost exclusively HE-Frag with a natural fragmentation warhead. With between 1.0 and 1.3 kg of explosive fill, these rockets are surprisingly effective weapons. The poor condition of the rockets shown in the above figure is not uncommon for 107-mm rockets discovered in Iraq or Afghanistan. The part of the rocket most sensitive to neglect is the propellant, so if the rocket motors are still in working order, the fuze becomes the determining factor on whether or not the warhead detonates.

(U) The following are fuzes designed for use with the 107-mm rocket:

- (U) Point-detonating (PD) fuzes (MJ-1 and copies).
- (U) RF proximity fuzes (MD-21).
- (U) Probable electronic or mechanical time fuzes (unknown designator).

(U//FOUO) The MJ-1 PD fuze is the most common fuze designed for the 107-mm rocket and is probably the most common initiator of reported 107-mm rocket detonations. The MD-21 was known to exist in Iraq and has been encountered on previous occasions, but never mated with a 107-mm rocket. Time fuzes for these rockets are not believed to be available in Iraq or Afghanistan.

(S//REL TO USA, MCFI) While there have been reports of unexplained airbursts from a variety of rockets, hard evidence of proximity fuze use was lacking. This discovery is the first confirmation we have of these fuzes being correctly associated with their intended rockets.

(U) "Advantage" of Proximity-Fuzed Rockets

(U//FOUO) An RF proximity fuze such as the MD-21 uses a radiofrequency signal to "ping" the ground and cause the warhead to detonate consistently within a specified height range above the ground. According to marketing literature, the MD-21 fuze height of burst (HOB) is preset and

nominally results in a burst altitude of 5 to 8 meters above the ground. These fuzes are preset to function in the proximity mode, and there are no known options for the user to change the setting of the fuze. However, if the proximity function fails, the fuze is designed with a PD backup function.

(U//FOUO) In the event of an airburst, fragments that would otherwise be directed into the ground immediately below the rocket during a typical point detonation have time and space to disperse horizontally and become lethal fragments. The following table shows the impact this has on the effective area of 107-mm rockets.

(U) 107-mm Rocket Lethality Data

Mean Area of Effectiveness (MAE)[a], m^2					
HOB = 0 m	**Angle of Fall**	**Standing**	**Prone**	**Prone, Protected**	**Foxhole**
	15	347.5	116.8	53.0	1.0
	30	373.1	136.1	62.2	1.0
	45	426.0	168.8	78.7	1.6
	60	591.7	243.1	113.9	2.5
	75	859.7	362.7	174.1	3.3
HOB = 1 m	**15**	454.7	254.2	125.7	15.5
	30	488.1	263.3	131.6	14.4
	45	569.9	321.2	160.7	20.3
	60	788.5	439.3	217.5	24.5
	75	1128.0	632.5	308.4	31.3
HOB = 3 m	**15**	475.2	321.4	187.7	42.0
	30	502.9	347.9	205.9	46.4
	45	613.1	420.0	245.5	51.6
	60	836.2	558.3	316.5	56.2
	75	1198.9	793.0	439.1	60.1
HOB = 5 m	**15**	458.2	348.0	223.8	57.3
	30	495.3	381.7	247.1	61.5
	45	597.9	453.5	287.7	63.9
	60	790.0	569.8	346.2	63.5
	75	1150.6	804.6	459.3	59.6
a. Casualty Criterion: 5-Minute Assault.					

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(U//FOUO) As seen in the table, the increase in lethality due to increased HOB depends largely on the nature of the target.

- (C//REL TO USA, MCFI) For comparable angles of fall, there is as much as a 30% increase in lethal area for standing personnel.
- (C//REL TO USA, MCFI) The lethality of proximity-fuzed 107-mm rockets can be more than four times greater for prone, protected personnel.
- (C//REL TO USA, MCFI) The most significant difference is for protected personnel without overhead cover (i.e., a foxhole), where a proximity-fuzed rocket can be 50-60 times more lethal than a point-detonating rocket.

(U) Significance of Fuze Discovery

(U//FOUO) Anti-Coalition forces have been known to use a variety of fuzes with 107-mm rockets including types that are not designed for these rockets and often do not even work. It is probable that

individuals launching the rockets are compelled to use whatever fuzes are made available to them as long as they match the fuze threads of the rocket. It is clear that the fuzes in the WIT report are MD-21 fuzes designed for use with 107-mm rockets, but it may be a mere coincidence in this case that they were correctly associated with their intended munitions. There is not any information to indicate that these fuzes were sought out specifically for their ability to enhance the rockets' lethality. However, the preset nature of these fuzes would allow them to function in a proximity mode without the operator ever knowing what type of fuzes they were. This is the significance of the discovery; regardless of a user's knowledge of the fuze type, MD-21 proximity fuzes can substantially increase the effective area of 107-mm rockets.

(U) Conclusion

(S//REL TO USA, MCFI) The 107-mm rockets discovered by the WIT/EOD team on 16 February 2006 are fuzed with proximity fuzes intended for use with these rocket types. The downrange effect of using these fuzes would be the same whether or not the insurgents knew these were proximity fuzes or if they were simply using the only fuzes available. The MD-21 RF proximity fuze will result in 107-mm rockets detonating at a burst height of 5 to 8 meters above the ground, significantly increasing the rockets' effective area.

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