



WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT

NO. WAL 710/286

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ELECTE

OCT 23 1984

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Resistance of Samples of "K Panels" to Perforation

by Cal. .45 Steel-Jacketed Ball Projectiles and

by the Fragment-Simulator, G-2

BY

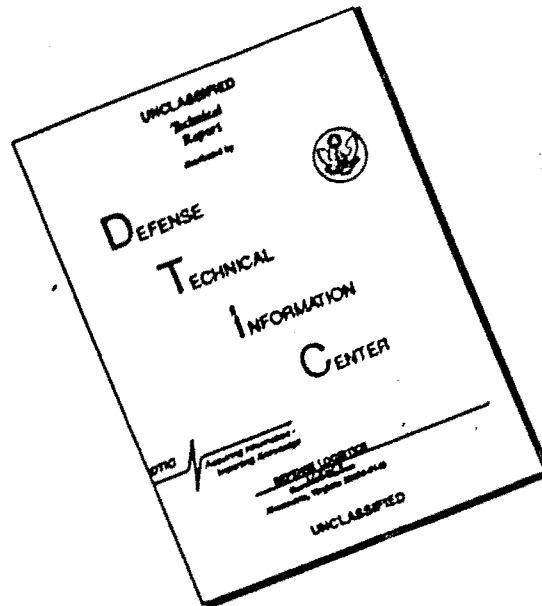
J. F. SULLIVAN
Asst. Engineer

DATE 28 December 1944

WATERTOWN ARSENAL
WATERTOWN, MASS.

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WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT NO. WAL 710/286

First and Final Report on Problem R-8.12

28 December 1944

Resistance of Samples of "K Panels" to Perforation

by Cal. .45 Steel-Jacketed Ball Projectiles and

by the Fragment-Simulator, G-2

1. In response to a request of the Office, Chief of Ordnance¹, tests have recently been conducted at this arsenal on several samples of "K panels" submitted by the U. S. Rubber Co., in collaboration with the Reynolds Metals Company.

2. The resistance of these samples to perforation by cal. .45 steel-jacketed ball projectiles and by cal. .22 fragment-simulating projectiles, G-2², was so appreciably inferior to that of Hadfield manganese steel of equivalent weight that the weather cycling tests suggested in the authorizing request were considered to be of no interest and were not conducted. → (to p 2)

3. Samples were measured and weighed and the weight/square foot and equivalent thickness of steel determined. The samples were then rigidly mounted on wooden ballistic frames and impacted fairly with cal. .45 steel-jacketed ball projectiles and with cal. .22 fragment-simulating projectiles, G-2. The results are shown in Table 1.

4. The resistance of all of these samples was considerably lower than that of Hadfield manganese steel of equivalent weight. Although this fact alone should not disqualify the material from consideration, since it has recently been established that there is a lack of correlation between the ballistic limit tests with these projectiles and service

1. O.O. 400.112/14862(c) - Wtn 400.112/3 (c). 29 July 1944

2. WAL 762/253 (c)

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attack, nevertheless it is considered that the theory underlying the fabrication of these samples is not sound from the viewpoint of resistance to perforation. It would be considered much more sound to concentrate the V-board components on the rear side of the aluminum rather than split them equally, sandwiching the aluminum as they have been in the subject sample.

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APPROVED:

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TABLE I

Summary of Ballistic Data Conducted at Watertown Arsenal on Samples of "K Panels"

Submitted by U. S. Rubber Co.

(September shipment)

Nominal Size-in.	Avg. Gross Thick.	Wt. Grams	V., Sec. Ft.	Quiv. Steel Thick.	Ballistic Limits	
					0-1, 1-51	0-2
.125"-.051"-.051" A	.262	1842	1354	.073"	—	1463
	.260	1820	1338	.072"	—	1405
	.260	1844	1355	.073"	—	1570
	.265	1841	1353	.073"	—	1440
	.264	1835	1349	.073"	871	—
	.265	1815	1339	.072"	937	—
	.256	1811	1331	.072"	940	—
	.255	1855	1343	.074"	980	—
.072"-.051"-.051" A	.22	1333	980	.053"	—	1320
	.203	1328	970	.053"	—	1328
	.213	1343	1002	.054"	—	1365
	.207	1309	977	.053"	—	1358
	.205	1334	980	.053"	—	1323
	.203	1335	981	.053"	757	—
	.198	1321	975	.053"	770	—
	.204	1342	983	.053"	775	—
	.210	1370	1007	.054"	809	—
	.211	1305	959	.052"	817	—
.060"-.051"-.051" A	.199	1270	933	.050"	—	1170
	.197	1267	944	.051"	—	1203
	.207	1312	964	.052"	—	1208
	.204	1309	952	.052"	—	1302
	.206	1260	926	.050"	—	1318
	.199	1265	940	.050"	725	—
	.202	1305	959	.052"	742	—
	.202	1273	933	.053"	718	—
	.203	1308	954	.053"	711	—
	.201	1273	933	.051"	711	—
.051"-.040"-.040" A	.208	1252	920	.050"	—	1173
	.193	1242	913	.049"	—	1147
	.208	1258	925	.050"	—	1150
	.213	1240	911	.049"	—	1155
	.207	1199	881	.048"	—	1093
	.200	1233	906	.049"	740	—
	.201	1242	904	.049"	740	—
	.200	1242	913	.049"	741	—
	.208	1240	911	.049"	740	—
	.199	1197	880	.048"	778	—
.040"-.040"-.040" A	.193	1140	838	.045"	—	1143
	.190	1145	840	.045"	—	1175
	.190	1171	844	.047"	—	1166
	.190	1171	844	.045"	—	1158
	.192	1175	844	.045"	—	1158
	.190	1175	844	.045"	—	—
	.190	1175	844	.045"	—	—
	.190	1175	844	.045"	—	—
	.190	1175	844	.045"	—	—
	.190	1175	844	.045"	—	—
FOR COMPARISON:						
Redfield manganese steel	—	—	—	.05"	—	1175

FOR COMPARISON:

Redfield manganese steel

1. Col. .125 steel-jacketed bullet - Penetration - 240 grs.
2. Col. .051 fragment - Penetration - 17 grs.