



DEPARTMENT OF THE ARMY
LONE STAR ARMY AMMUNITION PLANT
TEXARKANA, TEXAS 75501

Mr. Hodgson/djm/AUTOVON
829-1305

REPLY TO
ATTENTION OF

SARLS-EN

21 Sep 82

SUBJECT: MMT Project 5804487, Develop Dual Purpose M42/MLRS Grenade/Fuze
Assembly Capability

Commander
US Army Munitions Production
Base Modernization Agency
ATTN: SARPM-PBM-LS (Rich Smolen)
Dover, NJ 07801

Inclosed are prove out test observations and their analysis as provided by
Day and Zimmermann.

It is the opinion of this office that the equipment is functional and is accept-
able for production use.

FOR THE COMMANDER:

1 Incl
as

JERRY MELITO, P.E.
Chief, Engineering Division

CF:
DRCPM-RSEI (B. Ryland)
DRDAR-QAR-Q (J. Shim)
DRDAR-LC
DRSAR-ASN
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PROVE OUT
TEST ANALYSIS REPORT

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SUMMARY SHEET

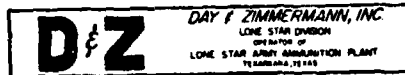
PROVE OUT TEST ANALYSIS

1. Equipment Tested: Dual Purpose (M42/46 and XM77)
Grenade/Fuze Assembly Machine
2. Project Number: 5804487
3. Contractor: Day & Zimmermann, Inc.
Texarkana, Texas 75501
4. Test Dates: August 17 - 19, 1982
5. Location of Test: Lone Star Army Ammunition Plant
Texarkana, Texas 75501
6. Test Results: See Test Summary (Table A) on the
following page.

During the Prove-Out Test, it was also satisfactorily demonstrated that the Grenade/Fuze Assembly machine can be converted from XM77 mode to M42/46 mode in less than eight (8) hours.

TEST SUMMARY

OPERATION DESCRIPTION	MTBF (min)		MTTR (min)		INHERENT AVAILABILITY(%)		REJECT RATE (%)		PROD. RATE
	Reqd.	Actual	Reqd.	Actual	Reqd.	Actual	Limit	Actual	
Grenade/Fuze Assembly									
a) XM77 Mode	3.46	5.76	0.92	0.95	80.0	85.9	4.0	0.9	24.75
b) M42/46 Mode	3.46	6.6	0.92	1.13	80.0	85.4	4.0	-	24.17



September 3, 1982
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5. Concluding Remarks.

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Test Data

I. INTRODUCTION

The Prove-Out test on Dual Purpose Grenade/Fuze (M42/46 and XM77) Assembly was conducted at Lone Star Army Ammunition Plant.

The Prove-Out test was conducted August 17 through 19, 1982.

On August 17, 1982 the first part of the test was conducted in XM77 Mode. Then, on the next day, (August 18, 1982) the machine was changed over to M42/M46 Mode, and on August 19, 1982 the remaining of the test was completed.

The machine on which this Prove-Out was conducted was an existing machine at LSAAP. The machine was modified according to the scope of work, MMT Project 5804487, such that the machine will be able to assemble M42/46 as well as XM77 Grenades for MLRS.

II. SYSTEM DESCRIPTION

The loaded grenade bodies are received at the Automatic Body Assembly System's untraying machine.

The trayed grenade bodies are manually removed from buggies and fed to the untraying machine. At this point the grenades are automatically removed from the trays and fed onto the infeed conveyor of the assembly machine. Grenade bodies are automatically picked up from infeed conveyor and placed on pallet of the assembly machine.

Grenades are automatically oriented to accept fuze assembly and are locked in position.

Fuzes for M42/46 or XM77 are delivered to the fuze-body assembly system as required.

Trayed fuzes are manually placed in automatic untraying machine. The untraying machine automatically removes fuzes from trays and feeds them into the Fuze Gage Station.

Fuze firing pin and the position of arming screw weight is automatically gaged. Accepted fuzes are automatically fed into the Fuze Placing Station of the Body Assembly System (this gaging operation runs slightly faster than the assembly machine to compensate for a reasonable number of rejects).

Assemble fuze to body - The fuzes are automatically positioned over studs on grenade body.

Fuze orient check - The following checks are automatically performed to insure proper positioning of fuze on body.

A. Orientation of fuze

B. Presence and position of spiral pin

Clinch fuze - The body studs are automatically staked to fasten the fuze assemblies to the body (staking pressure is regulated and monitored by means of a hydraulic control system).

Washer Feed - The washers are automatically fed on to the tape fixture, two fixtures at a time, from a Vibratory Syntron.

Next to the tape (along with the tape stiffener in the case of the M42/46 Grenades) is manually placed on the fixture.

The staking fixture with tape/tape stiffener assembly is automatically positioned over the arming screw of the fuze.

The tape/tape stiffener assembly is automatically clinched to the rivet end of fuze arming screw (staking pressure is regulated by a hydraulic Control System).

The staking fixture is removed from the assembly machine and recirculated for placement of more tape stiffener assemblies.

The grenade assemblies with tape stiffener assembly, are conveyed to the tape stiffener winding fixtures where the tape stiffener assemblies are automatically wound.

In the case of the XM77 Grenade, the machine also automatically puts a stabilizer, after the tape is wound, for the retention of the tape.

The grenade assembly is now complete and automatically removed from the assembly machine and placed on outfeed conveyor to be carried to traying station where the accepted grenades are trayed and placed in buggies for move to lot acceptance holding building as required.

Each Automatic Body Assembly System operates at a machine rate of 30 ppm.

III. TEST PROCEDURE AND REQUIREMENTS

1. (a) The Prove-Out involved conducting of the test on the Grenade/Fuze Assembly Machine in two (2) different modes.
 - 1) XM77 Mode
 - 2) M42/46 Mode

- (b) Duration of test in each Mode was to be approximately 400 minutes (i.e. one (1) shift).
 - (c) After the test in one Mode is complete, the machine was to be changed over to the other Mode and the remaining of the test conducted.
 - (d) During each Mode of the test, the machine was supposed to cycle at a minimum rate of 30 ppm, and demonstrate and availability of 80%. In other words, accumulated downtime for all corrective and preventive maintenance actions, during each Mode, was not to exceed 80 minutes during an actual test time of 400 minutes.
 - (e) During each Mode of the test, the machine was to demonstrate an MTBP of 3.46 minutes and an MTTR of 0.92 minutes.
 - (f) The change over time from one Mode to another was not to exceed 8 hours.
 - (g) The reject (scrap) rate was not to exceed 4% of the production.
 - (H) During the test, live grenades were to be produced.
2. As per the understanding between the Project Manager's office and the Project Engineer, Don Bateson of Day & Zimmermann, Inc., the preventive and corrective maintenance actions which were to be considered as downtime were to be just confined to the MLRS modifications done to the machine. Any other downtime, outside the MLRS modifications, were to be considered as administrative downtime.

As such, the maintenance actions with respect to the following will only be considered as downtime.

- (1) Washer Feed Station
- (2) Tape Fixture Assembly
- (3) Tape Winder

(4) Tape Stripper Station

(5) Retention of Tape Stabilizer After Fold

IV. DATA ANALYSIS

The RAM data during the test was collected in accordance with the format of DRDAR-QA Form 438.

The analysis of the test results are tabulated on the following page (Table B).

The formula used in arriving at the various parameters are presented within the respective parenthesis.

The parameters (MTBF, MTTR, Inherent Availability) were calculated for the system which was within the scope of MLRS modification, (See Section III, paragraph 2).

Also, during the Prove-Out test, it was demonstrated that the conversion of the machine from XM77 Mode to M42/46 Mode takes a time duration of about four (4) hours. The requirement being eight (8) hours.

DATA ANALYSIS RESULTS

	XM77 Mode	M42/46 Mode
A. Scheduled test time	415 min	415 min
B. Administrative downtime	16 min	- -
C. Downtime outside the scope of MLRS modification	77 min	143.34 min
D. Downtime within the scope of MLRS modification	45.46 min	39.51 min
E. Scheduled uptime (a-b-c-)	322 min	271.66 min
F. Actual uptime (e-d)	276.54 min	232.15 min
G. Total number of units produced	8042	6565
H. Rejects	73	- -
I. Reject rate	0.9%	- -
J. Acceptable units produced	7969	6565
K. Production rate (i/e)	24.75 ppm	24.17 ppm
L. Number of failures within the scope of MLRS modification	48	35
M. MTBF (e-d/k)	5.76 min	6.6 min
N. MTTR (d/l)	0.95 min	1.1 min
O. Inherent availability	85.88%	85.38%

Table-B

DOWNTIME ANALYSIS OF GRENADE/FUZE ASSEMBLY MACHINE

1. XM77 Mode

(a) Outside the scope of modifications

NO	Station/Problem	Frequency	Total Time	Average Time
1	Fuze Feed	40	58.38 min	1.46 min
2	Fixture fail to retract	27	8.96 min	0.33 min
3	Body Placing Station	4	2.25 min	0.56 min
4	Grenade Removal Station	4	1.90 min	0.48 min
5	Grenade conveyor	3	2.50 min	0.83 min
6	Fixture failed to go into station	2	1.52 min	0.76 min

(b) Within the scope of modifications

1	Ribbon Winder	15	12.35 min	0.82 min
2	Clip Feed	25	30.40 min	1.22 min
3	Washer Feed	8	2.71 min	0.34 min

2. M42/46 Mode

(a) Within the Scope of Modifications.

NO.	STATION/PROBLEM	FREQUENCY	TOTAL TIME	AVERAGE TIME
1	Ribbon Winder	18	26.40 min	1.47 min
2	Clip Feed	6	6.02 min	1.00 min
3	Washer Feed	8	3.73 min	0.47 min
4	Misc	2	3.36 min	1.68 min

(b) Outside the Scope of Modifications

1	Fuze Feed	119	105.47 min	0.89 min
2	Fixture failed to retract	28	13.95 min	0.50 min
3	Grenade Removal Station	6	3.80 min	0.63 min
4	Fixture failed to go into Station	4	1.97 min	0.49 min
5	Body Feed Conveyor	4	4.32 min	1.08 min
6	Stuck Grenade on belt	4	1.65 min	0.41 min
7	Grenade fell on conveyor	4	1.75 min	0.44 min
8	No Body	2	0.79 min	0.40 min
9	Worked on pallets	2	3.75 min	1.86 min
10	Body Placing Station	1	0.30 min	0.30 min
11	Body Orienting Station	1	0.99 min	0.99 min
12	Changed Punches	1	2.85 min	2.85 min
13	Outfeed Conveyor got jammed	1	0.60 min	0.60 min

The Dual Purpose Grenade/Fuze Assembly machine met all the test requirements, (see Test Summary - Table A) except that the machine demonstrated an MTTR of 0.95 minutes and 1.13 minutes in XM77 and M42/M46 Modes respectively, while the requirement was 0.92 minute. The difference being very marginal.

- 1) The existing Grenade/Fuze Assembly machine which was picked for the modification was not under production for a long time.
- 2) The machine was, as far as the test was concerned, was debugged with respect to the modifications only.
- 3) Most of the downtime outside the scope of modifications was due to the Fuze Feed Station. This in no way reflects the actual capability of this Station. During M42 line prove out, it was demonstrated that this Station was more than capable of meeting the requirements. Much of the problem with this Station, which was not in production for a long time, was due to sticking control valves.
- 4) Also during the test, it was found that the studs on the grenade bodies were having burrs which was causing jams on the Station when the Station was trying to place the fuze on the grenade body.

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS		
B-4, 8W, LSAAP				M42 Grenade/Fuze Assembly		6565		PARTS X OTHER		
PAGE 1 OF 13										
		TIME		TIME		RATE		ACCEPT		
		START OF SHIFT 07:27		END OF SHIFT 15:27		30 ppm		6565		
								REJECTS		
								0		
								EQUIPMENT FAILURE CODE		
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS		MP			
			MIN.	SEC. (100)						
8/19/82	727	3	1	18	Ribbon winder					
	729	3		50	Ribbon winder					
	730	3	1	65	Switch malfunction					
	732	3	9	85	Ribbon winder					
	743	3	4	01	Ribbon winder					
	748	3	2	80	Clip feed					
	750	6	1	90	Fuze feed					
	753	6		55	Fixture retract					
	754	6	1	03	Fuze feed					
	755	6		40	Fuze feed					
	756	3		90	Clip feed					
	758	3		70	Ribbon winder					
	759	6		77	Fuze feed					
	800	6		55	Fixture retract					
	801	6	1	03	Fuze feed					
	802	6		42	Fuze feed					
	803	3		98	Ribbon winder					
	805	3		23	Ribbon winder					

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRADCOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP		13		M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 2 OF 13		TIME		TIME		RATE		ACCEPT	
		START OF SHIFT		END OF SHIFT					
DATE		EVENT TIME		EVENT CODE		DURATION		REMARKS	
						MIN. SEC.			
8/19/82	805	3			25				
	806	3			60				
	808	3			15				
	809	3			44				
	809	6		14	50				
	825	6			75				
	826	3		1	35				
	830	3			40				
	830	6			60				
	831	3			92				
	833								
	835	6			31				
	835	6		1	30				
	836	6			92				
	837	6		1	25				
	843	6			75				
	844	6			20				
	847	3		2	30				

EVENT CODES		1. END OF SHIFT 2. BREAK/LUNCH		3. CORRECTIVE MAINTENANCE		5. PREVENTIVE MAINTENANCE		6. ADMINISTRATIVE (STATE REASON)		7. ARRADCOM RESERVED		8. OPERATIONAL DOWNTIME (TOOL CHANGE)	

SIGNATURE		PRINTED NAME	

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		EQUIPMENT FAILURE CODE	
B-4 LSAAP		M42 Grenade/Fuze Assembly							
PAGE 3 OF 13		TIME		TIME		RATE		ACCEPT	
START OF SHIFT		END OF SHIFT		REMARKS		MP		REJECTS	
DATE	EVENT TIME	EVENT CODE	DURATION	MIN.	SEC.	REMARKS		EQUIPMENT FAILURE CODE	
8/19/82	852	6			55	Fuze feed			
	853	3	1		05	Ribbon winder			
	857	6			31	Fixture retract			
	858	6			30	Fixture retract			
	859	6			22	Fixture retract			
	902	6			78	Fuze feed transfer			
	903	6			50	Fixture retract			
	903	6			30	Fixture retract			
	904	6			30	Grenade pick up station			
	905	3			50	Station #1 (ribbon winder)			
	907	6			30	Fixture retract			
	909	6	2		80	Worked on pallets			
	912	6			40	Fuze fixture retract			
	915	6			80	Fuze feed			
	916	3			30	Ribbon winder			
	917	6			40	Fixture retract			
	918	6			36	Fuze feed			
	919	6			50	Fixture failed to go into station			

1. END OF SHIFT
2. BREAK/LUNCH
3. CORRECTIVE MAINTENANCE
4. END OF TEST

5. PREVENTIVE MAINTENANCE
6. ADMINISTRATIVE (STATE REASON)
7. ARRADCOM RESERVED
8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		EQUIPMENT	
B-4 LSAAP		PAGE 4 OF 13		M42 Grenade/Fuze Assembly				FAILURE CODE	
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	RATE	ACCEPT	REJECTS	
			MIN.	SEC.					
8/19/82	920	6		95	Fixture retract				
	925	6		40	Body conveyor (infeed)				
	925	6		50	Tape fixtures retract				
	927	6		25	Grenade pick-up station				
	929	6	1	15	Tape fixture retract				
	930	2	15	00	Break				
	945	6		95	Working on pallets (replaced)				
	946	6		75	Grenade take off				
	948	6	2	92	Body conveyor (infeed)				
	951	6		80	Take off grenade station				
	952	6		30	Body placing				
	954	6		45	Fuze feed				
	955	6	1	15	Fuze feed				
	956				30 ppm				
	959	3		18	Washer feed - no fixtures				
	1000	6		45	Take off grenade station				
	1001	3		30	Washer feed - no fixtures				
	1003	3	1	10	Washer feed - no fixtures				

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

1. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRACOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP		13		M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 5 OF 13		TIME		TIME		RATE		REJECTS	
		START OF SHIFT		END OF SHIFT					
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE		
			MIN.	SEC.					
8/19/82	1007	6		20	Tape fixture retract				
	1011	3		45	No fixtures - washer feed problem				
	1015	6		50	Fixture failed to go into station				
	1017	6		35	Stuck grenade on belt				
	1019	6		15	Fixture retract				
	1019	6		35	Fuze feed				
	1023	6		50	Fuze feed				
	1025	6		45	Fuze feed				
	1027	6		42	Fuze feed				
	1030	6	2	38	Fuze feed				
	1033	6		40	Body infeed conveyor				
	1035	6		42	Tape fixture failed to go into station				
	1036	6		30	Fuze feed (no fuze)				
	1037	6		99	Body operating station				
	1040	6		47	Fuze feed				
	1041	3		50	Clip feed				
	1042	6		35	Fuze feed				

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

PREVENTIVE MAINTENANCE

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRACOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

[illegible]

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP				M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 7 OF 13				TIME		RATE		REJECTS	
				START OF SHIFT		END OF SHIFT			
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE		
			MIN.	SEC.					
8/19/82	1201	3	1	40	Ribbon winder				
	1203	3		36	Grenade fell				
	1203	3		74	Ribbon winder				
	1205	6	2	90	Fuze feed (no fuze)				
	1208	3		25	Clip feed				
	1210	6		90	Fuze feed (no fuze)				
	1212	6		60	Body conveyor (infeed)				
	1216	6	2	85	Change punches				
	1222	6		22	Tape fixture retract				
	1225	3		65	Clip feed				
	1226	6		35	No fuze				
	1228	6		35	No fuze				
	1231				30 ppm				
	1232	6	1	35	No fuze				
	1236	6		31	No body in station				
	1237	6		35	No fuze				
	1240	6		65	No fuze				
	1241	6		52	No fuze				

EVENT CODES	1. END OF SHIFT 2. BREAK/LUNCH 3. CORRECTIVE MAINTENANCE 4. END OF TEST	5. PREVENTIVE MAINTENANCE 6. ADMINISTRATIVE (STATE REASON) 7. ARRADCOM RESERVED 8. OPERATIONAL DOWNTIME (TOOL CHANGE)	SIGNATURE	PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP				M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 8 OF 13				TIME		RATE		REJECTS	
				START OF SHIFT		END OF SHIFT			
DATE		EVENT TIME		EVENT CODE		DURATION		REMARKS	
						MIN. SEC.			
8/19/82	1242	6				47		No fuze	
	1243	6				60		No fuze	
	1244	6				61		No fuze	
	1245	6		2		01		No fuze	
	1247	6		1		62		No fuze	
	1250	6		10		50		No fuze, - fuze conveyor	
	1302	6		1		55		No fuze	
	1305	6				37		No fuze	
	1306	6				55		No fuze	
	1306	6				50		No fuze	
	1307	6		1		70		No fuze	
	1308	6				70		No fuze	
	1310	6				61		No fuze	
	1311	6		3		20		No fuze	
	1315	6				45		No fuze	
	1315	6				75		No fuze	
	1316	6				20		No fuze	
	1317	6		1		10		No fuze	

EVENT CODES		1. END OF SHIFT 2. BREAK/LUNCH 3. CORRECTIVE MAINTENANCE 4. END OF TEST		5. PREVENTIVE MAINTENANCE 6. ADMINISTRATIVE (STATE REASON) 7. ARRADCOM RESERVED 8. OPERATIONAL DOWNTIME (TOOL CHANGE)		SIGNATURE		PRINTED NAME	

R.A.M. DATA

PLACE B-4 LSAAP		OPERATION M42 grenade/Fuze Assembly		PROCESSED		POUNDS PARTS OTHER	
PAGE 9 OF 13		STATION NO.		TIME START OF SHIFT		TIME END OF SHIFT	
DATE	EVENT TIME	EVENT CODE	DURATION MIN. SEC.		REMARKS	MP	EQUIPMENT FAILURE CODE
8/19/82	1318	6	3	05	No fuze		
	1321	6		30	No fuze		
	1322	6		48	No fuze		
	1323	6		30	No fuze		
	1327	6		85	No fuze		
	1328	6		30	No fuze		
	1330	2	15	00	Break		
	1345	6		20	No fuze		
	1346	6		25	No fuze		
	1349				30 ppm		
	1350	6		45	No fuze		
	1350	6		37	No fuze		
	1351	6		20	Tape fixture retract		
	1354	6		21	Grenade fell		
	1355	6		45	No fuze		
	1355	6		35	No fuze		
	1358	6		50	No fuze		
	1400	6		40	No fuze		

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRACOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP				M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 10 OF 13				TIME		TIME		REJECTS	
				START OF SHIFT		END OF SHIFT		ACCEPT	
				MIN.		SEC.		RATE	
DATE	EVENT TIME	EVENT CODE	DURATION	REMARKS	MP	EQUIPMENT FAILURE CODE			
8/19/82	1401	6	48	No body in station					
	1402	6	59	No fuze					
	1403	6	33	No fuze					
	1405	6	29	No fuze					
	1405	6	27	Fixture retract					
	1406	6	45	No fuze					
	1409	6	47	No fuze					
	1410	6	31	No fuze					
	1410	6	45	No fuze					
	1414	6	70	Fixture retract					
	1415	6	33	Fixture retract					
	1416	6	35	No fuze					
	1417	6	47	No fuze					
	1418	6	05	No fuze					
	1419	6	30	Fixture retract					
	1422	6	45	Fallen grenade					
	1424	6	62	No fuze					
	1425	6	85	No fuze					

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRADCOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP				M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 11 OF 13				TIME		RATE		REJECTS	
				START OF SHIFT					
				END OF SHIFT					
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE		
			MIN.	SEC.					
8/19/82	1425	6		35	No fuze				
	1427	6	1	18	No fuze				
	1429	6	2	35	No fuze				
	1432	6		30	No fuze				
	1434	6		22	Fixture retract				
	1435	6		35	Fixture retract				
	1436	6		48	Grenades hung in conveyor				
	1437	6		32	Grenades hung in conveyor				
	1438	6		85	No fuze				
	1440	6		28	No fuze				
	1440	6		47	No fuze				
	1445	6		25	No fuze				
	1445	6		65	No fuze				
	1446	6		70	Dropped grenade at body placing station				
	1447	6		55	Fuze feed				
	1449	6		40	Fuze feed				
	1450	6		50	Fuze feed				
	1450	6	1	35	Fuze feed				

EVENT CODES	1. END OF SHIFT	2. BREAK/LUNCH	3. CORRECTIVE MAINTENANCE	4. END OF TEST	5. PREVENTIVE MAINTENANCE	6. ADMINISTRATIVE (STATE REASON)	7. ARRADCOM RESERVED	8. OPERATIONAL DOWNTIME (TOOL CHANGE)	SIGNATURE	PRINTED NAME

R.A.M. DATA

PLACE		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP		M42 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 12 OF 13		STATION NO.		TIME		REJECTS	
				RATE		ACCEPT	
		END OF SHIFT					
		START OF SHIFT		REMARKS		EQUIPMENT FAILURE CODE	
		DURATION				MP	
		MIN. SEC.					
8/19/82	1451	6	85	No fuze			
	1453	6	30	No fuze			
	1454	6	30	No fuze			
	1455	6	50	Outfeed conveyor (grenades jammed)			
	1456	6	25	No fuze			
	1457	6	40	No fuze			
	1458	6	45	No fuze			
	1459	6	30	No fuze			
	1500	6	25	Fixture retract station			
	1504	6	60	Outfeed conveyor jammed			
	1505	6	55	No fuze			
	1506	6	60	No fuze			
	1508	6	80	No fuze			
	1511	6	25	No fuze			
	1512	6	30	No fuze			
	1513	6	55	No fuze			
	1515	6	20	No fuze			
	1516	6	20	No fuze			

EVENT CODES

1. END OF SHIFT
2. BREAK/LUNCH
3. CORRECTIVE MAINTENANCE
4. END OF TEST

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRADCOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

[illegible]

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4, LSAAP				XM77 Grenade/Fuze Assembly		8042		PARTS X OTHER	
PAGE 1 OF 10				TIME		RATE		REJECTS	
				START OF SHIFT 7:29		30 PPM		7969	
				END OF SHIFT 15:25					
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE		
			MIN.	SEC.(100)					
8/17/82	729	6		55	Fuze feed				
	729	6		25	fixture retract				
	730	6	1	00	Body station not taking off				
	731	6	1	05	Fixture not going on Station				
	732	6	1	75	Grenade conveyor				
	737	6		40	Grenade take off				
	739	3		55	Clip feed				
	738	6		30	Fixture retract				
	740	6		42	Add clips				
	741	6		25	Fixture retract				
	745	6		60	Grenade take off				
	748	3		42	Ribbon winder #8				
	748	3	1	10	Ribbon winder #8				
	750	3		65	Ribbon winder #8				
	751	6		50	Grenade take off				
	752	6		40	Fuze feed				
	759	6		75	Add clips				
	802	6	1	15	Fuze feed				

EVENT CODES

1. END OF SHIFT
2. BREAK/LUNCH
3. CORRECTIVE MAINTENANCE
4. END OF TEST

3. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRACOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE		STATION NO.		OPERATION		TIME		PROCESS		EQUIPMENT FAILURE CODE	
B-4, LSAAP		PAGE 2 OF 10		XM77 Grenade/Fuze Assembly		START OF SHIFT		RATE		MP	
EVENT CODES		END OF SHIFT		DURATION		REMARKS		REJECTS		SIGNATURE	
1. END OF SHIFT		2. BREAK/LUNCH		3. CORRECTIVE MAINTENANCE		4. END OF TEST		5. PREVENTIVE MAINTENANCE		6. ADMINISTRATIVE (STATE REASON)	
3. CORRECTIVE MAINTENANCE		4. END OF TEST		5. PREVENTIVE MAINTENANCE		6. ADMINISTRATIVE (STATE REASON)		7. ARRADCOM RESERVED		8. OPERATIONAL DOWNTIME (TOOL CHANGE)	
8/17/82	803	3				65					
	804	3		1		20					
	806	6				20					
	810	6				45					
	814	6				28					
	816	3		1		25					
	818										
	819	6				25					
	822	6		1		17					
	826	6				40					
	829	6				40					
	834	3				48					
	835	3				15					
	837	6				30					
	841	3				25					
	841	6				50					
	844	6				60					
	848	3				25					

R.A.M. DATA

PLACE		STATION NO.		OPERATION		PROCESSED		POUNDS	
B-4, LSAAP				XM77 Grenade/Fuze Assembly				PARTS OTHER	
PAGE	OF			TIME	TIME	RATE	ACCEPT	REJECTS	
3	10			START OF SHIFT	END OF SHIFT				
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE		
			MIN.	SEC.					
8/17/82	850	6		35	Body placement				
	851	6		45	Body placement				
	852	6	2	33	Out of clips				
	855	3		50	Clip placer				
	856	3	2	25	Clip placer				
	859	6		47	Fixture not going into station				
	801	6		92	Fuze feed				
	904	3		40	Washer feed				
	905	6		45	Grenade conveyor belt loose				
	907	6	2	00	Fuze feed				
	909	6		20	Fuze feed				
	910	6		30	Grenade conveyor				
	910	6		70	Fuze feed (BOH came loose)				
	913	6	3	20	Fuze feed (BOH came loose)				
	916	6		20	Fuze feed				
	916	6	13	36	Fuze feed (BOH came loose)				
	929	2	16	00	Break				
	945	6		65	Fuze feed				

EVENT CODES

- 1. END OF SHIFT
- 2. BREAK/LUNCH
- 3. CORRECTIVE MAINTENANCE
- 4. END OF TEST
- 5. PREVENTIVE MAINTENANCE
- 6. ADMINISTRATIVE (STATE REASON)
- 7. ARADCOM RESERVED
- 8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE _____

PRINTED NAME _____

R.A.M. DATA

PLACE B-4, LSAAP		OPERATION XM77 Grenade/Fuze Assembly		PROCESSED		POUNDS	
PAGE 4 OF 10		STATION NO.		TIME START OF SHIFT		TIME END OF SHIFT	
EVENT TIME		EVENT CODE		DURATION MIN. SEC.		REMARKS	
DATE		EVENT CODE		DURATION MIN. SEC.		REMARKS	
8/17/82	947	6		65		Fuze feed	
	949	6		85		Fuze feed	
	950	6		42		Fuze feed	
	952	6		37		Fuze feed	
	953	3		43		Washer feed	
	956	6		80		Fuze feed	
	957					31 ppm	
	1000	6		35		No fixtures (operator)	
	1001	6		20		No fixtures (operator)	
	1002	3		90		Ribbon winder	
	1003	3		25		Ribbon winder	
	1005	3		65		Ribbon winder	
	1006	3		50		Ribbon winder	
	1008	6		30		No fixtures (operator)	
	1010	6		20		No fixtures (operator)	
	1013	6		21		No fixtures (operator)	
	1015	6		25		Add clips	
	1019	3		78		Ribbon winder #3	

EVENT CODES		1. END OF SHIFT		2. BREAK/LUNCH		3. CORRECTIVE MAINTENANCE		4. END OF TEST		5. PREVENTIVE MAINTENANCE		6. ADMINISTRATIVE (STATE REASON)		7. ARRADCOM RESERVED		8. OPERATIONAL DOWNTIME (TOOL CHANGE)		SIGNATURE		PRINTED NAME	

R.A.M. DATA

PLACE		OPERATION		PROCESSED		POUNDS	
B-4, LSAAP		XM77 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 5 OF 10		STATION NO.		TIME		REJECTS	
				END OF SHIFT			
				RATE		ACCEPT	
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE
			MIN.	SEC.			
8/18/82	1025	3	1	55	Ribbon winder		
	1031	6		80	Add clips		
	1034	6		57	Add clips		
	1035	6		20	Fixture retract		
	1037	6		46	Fuze feed		
	1038	3		30	Ribbon winder		
	1042	3	1	60	Clip feed		
	1043	6	2	62	Fuze feed		
	1046	6		45	Fixture retract		
	1048	6		30	Fixture low (operator)		
	1053	6		40	Fixture low (operator)		
	1055	6		15	Fixture low (operator)		
	1056	6		21	Fixture low (operator)		
	1057	6		60	Fuze feed		
	1058	6		52	No ribbon on fixture (operator)		
	1102	6		20	Fixtures low (operator)		
	1103	6		68	Fuze feed		
	1105	3		70	Clip feed		

EVENT CODES

1. END OF SHIFT
2. BREAK/LUNCH
3. CORRECTIVE MAINTENANCE
4. END OF TEST

5. PREVENTIVE MAINTENANCE
6. ADMINISTRATIVE (STATE REASON)
7. ARRADCOM RESERVED
8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

R.A.M. DATA

[illegible]

R.A.M. DATA

PLACE		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP		XM77 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 7 OF 10	STATION NO.	TIME		TIME		REJECTS	
		START OF SHIFT		END OF SHIFT			
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE
			MIN.	SEC.			
8/17/82	1202	3	14	00	Clip feed		
	1218	6		25	Fixture retract station		
	1226	6		25	Fixture retract station		
	1231	3		20	Cleared clip feed		
	1234	6		40	Grenade turned over at take off		
	1235	6	1	30	Fuze feed, (fuze gaging)		
	1240	6		20	To allow buggies of grenades and tow motor to go through bay.		
	1242	6		25	Spiral pin bent on fuze (bad part)		
	1243	6		55	Fixture without ribbon (operators fault)		
	1244	6		25	Fixture without ribbon (operators fault)		
	1248	6		25	Fuze feed		
	1249	6		25	Fixture retract station		
	1257	6		40	Added clips		
	1300	6		15	Fixture retract station		
	1303	6		15	Fixture retract station		
	1309	6		25	Fixture retract station		
	1309	6		25	Fixture retract station		
	1315	6		50	Fixture retract station		

EVENT CODES

1. END OF SHIFT

2. BREAK/LUNCH

3. CORRECTIVE MAINTENANCE

4. END OF TEST

5. PREVENTIVE MAINTENANCE

6. ADMINISTRATIVE (STATE REASON)

7. ARRADCOM RESERVED

8. OPERATIONAL DOWNTIME (TOOL CHANGE)

SIGNATURE

PRINTED NAME

SIGNATURE

PRINTED NAME

R.A.M. DATA

PLACE B-4, LSAAP		OPERATION XM77 Grenade/Fuze Assembly		PROCESSED		POUNDS PARTS OTHER	
PAGE 8 OF 10		STATION NO.		TIME START OF SHIFT		TIME END OF SHIFT	
DATE	EVENT TIME	EVENT CODE	DURATION MIN. SEC.		REMARKS	MP	EQUIPMENT FAILURE CODE
8/17/82	1316	3		70	Clip feed station		
	1324	6		20	Fixture retract station		
	1325	6		95	Added clips		
	1329	6		30	Fixture retract station		
	1330	2	15	00	Break		
	1350	6		20	Fuze feed		
	1351	6		40	Fuze feed		
	1353	3		50	Washer feed		
	1358	6		40	Loose ribbon on conveyor		
	1400	6		35	Fixture retract station		
	1405	3		45	Winder feed loose		
	1406	6		75	Fuze feed		
	1407	6		40	Fuze feed		
	1411	6		45	Fixture retract station		
	1415	3		65	Clip station		
	1419	6	8	70	Fuze feed (magnetic bar transfer) logic problem		
	1429	6	4	65	Fuze feed (magnetic bar transfer) logic problem		
	1434	6	1	35	Fuze feed (magnetic bar transfer) logic problem		

EVENT CODES	1. END OF SHIFT 2. BREAK/LUNCH 3. CORRECTIVE MAINTENANCE 4. END OF TEST	5. PREVENTIVE MAINTENANCE 6. ADMINISTRATIVE (STATE REASON) 7. ARADCOM RESERVED 8. OPERATIONAL DOWNTIME (TOOL CHANGE)	SIGNATURE	PRINTED NAME

R.A.M. DATA

PLACE		OPERATION		PROCESSED		POUNDS	
B-4 LSAAP		XM77 Grenade/Fuze Assembly				PARTS OTHER	
PAGE 9 OF 10		STATION NO.		TIME		REJECTS	
				END OF SHIFT		ACCEPT	
				RATE			
DATE	EVENT TIME	EVENT CODE	DURATION		REMARKS	MP	EQUIPMENT FAILURE CODE
			MIN.	SEC.			
8/17/82	1436	6	4	30	Fuze feed (magnetic bar transfer) logic problem		
	1441	6	1	55	Fuze feed (magnetic bar transfer) logic problem		
	1443	6		45	Fixture retract station		
	1443	3		40	Clip feed		
	1446	6		55	Clip supply		
	1448	3		25	Clip feed		
	1450	3		40	Clip feed		
	1451	6		20	Fixture retract station		
	1452	6		25	Fixture retract station		
	1454	6		25	Fuze placing station		
	1458	6		30	Fixture retract station		
	1503	3		25	Clip feed		
	1505	3		85	Clip feed		
	1506	3		30	Clip feed		
	1506	3		40	Clip feed		
	1507	6		85	Supply clips		
	1508	3		60	Clip feed		
	1508	3		30	Clip feed		

EVENT CODES

1. END OF SHIFT
2. BREAK/LUNCH
3. CORRECTIVE MAINTENANCE
4. END OF TEST

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