

# 2013 BTU Ladder Testing Cycle

## *Program Summary*



By: Mike Waters, Butte Unit Safety Officer

During the 2013 annual ladder testing cycle, the Butte Unit performed annually required ladder testing, in accordance with NFPA 1932 standards, on 143\* ground ladders. The ground ladders within the Butte Unit are varied in lengths and configurations, and include the following lengths/types of ground ladders:

- 10' attic and one fly extension ladders
  - 12' single fly extension ladders
    - 14' roof ladders
  - 16' two fly extension ladders
  - 20' two fly extension ladders
  - 24' single fly extension ladders
- 35' one and two fly extension ladders

\*At the time of this report, there were still 8 engines that had not had their ladder complement tested yet and those numbers are not reflected in the total number of ladders tested.

NFPA 1932 calls for the following tests to be performed, at a minimum, on an annual basis or after suspected damage or exposure to high heat:

1. **Visual Ladder Inspection:** Looking for any obvious wear/damage to the ladder components, i.e. beams, rungs, halyard if equipped, lock assemblies if equipped, required labels are present and readable, heat sensors are present and not discolored or expired.
2. **Horizontal Bend Test:** Application of a predetermined test weight for one minute, remove the weight, take a central measurement on the beam of the ladder to the ground surface, apply a full test weight (weight is based upon type of ladder being tested) for five minutes, remove the weight, take another central measurement at the same point on the ladder as the first measurement. Ladder length determines the amount of acceptable deflection between both measurements to determine whether the ladder is still “in service” or “out of service”.
3. **Roof Hook Test:** Only applicable to ladders equipped with roof hooks. Extend the hooks, Use a square to determine a measureable line off of the hooks that is reproducible. Apply 1000 psi of pressure to hooks for one minute. Reassess previous line for any deviation of the hooks that shows permanent deformation from the test weight.
4. **Extension Hardware Test:** Only applicable to extension ladders. Apply 1000 psi of pressure to rungs, against the lock assemblies, for one minute. Failure is determined by catastrophic failure of any of the lock assemblies.

If any failures are noted at any time during the testing, most repairs are able to be made on site and the test can be repeated to ensure compliance with NFPA standards. Any rungs that need replacement are moved to the county shop where HEM Steve Winterath makes the repairs, as he is the only currently qualified aluminum welder within the unit. All ladders are re-tested, prior to being put back into service after all repairs, other than minor issues such as a halyard replacements or the labels being replaced.

Here is a breakdown of the currently assigned ladders within the Butte Unit:

2013 Ladder Testing Inventory														Updated 3/31/13						
14' Ladders		16' Ladders		20' Ladders		24' Ladders		35' Ladders		Attic Ladders		Other								
X	14-1	E-63	X	16-1	WT-31		20-1	E2169	X	24-1	E-73	X	35-1	E-64	X	A-1	E-24		12-1	WT-42
X	14-2	E-73	X	16-2	E2182	X	20-2	E2176	X	24-2	E-44	X	35-2	WT-31	X	A-2	WT-24	X	12-2	WT-25
X	14-3	E-74	X	16-3	E-233		20-3	WT-42	X	24-3	E-63	X	35-3	Spare	X	A-3	E-10	X	12-3	S-33
X	14-4	WT-55		16-4	E2181	X	20-4	E2186	X	24-4	E-61	X	35-4	T-74	X	A-4	E-245	X	12-4	E-26
X	14-5	E-24	X	16-5	E2166	X	20-5	E2160	X	24-5	E-31	X	35-5	E-42	X	A-5	E-73	X	12-5	T-74
X	14-6	E-10		16-6	E2167	X	20-6	E2162	X	24-6	E-12	X	35-6	T-74	X	A-6	E-37	X	12-6	E-87
X	14-7	WT-24	X	16-7	E2170	X	20-7	E2168	X	24-7	E-41	X	35-7	T-81	X	A-7	E-25			
X	14-8	E-64	X	16-8	E-60	X	20-8	E2161	X	24-8	E941	X	35-8	E-72	X	A-8	E-271			
X	14-9	E-31		16-9	E2168	X	20-9	E2163	X	24-9	E-45	X	35-9	Spare	X	A-9	E-26			
X	14-10	E-42		16-10	WT-52	X	20-10	E2184	X	24-10	E-271				X	A-10	E-44	X	10-1	S-24
X	14-11	E-25	X	16-11	E-212	X	20-11	E2180	X	24-11	E-24				X	A-11	E-72	X	10-2	OTC
X	14-12	E-245	X	16-12	R-44	X	20-12	E2164	X	24-12	WT-24				X	A-12	S-61			
	14-13	spare	X	16-13	R-44	X	20-13	T-74	X	24-13	E-10				X	A-13	E-273			
X	14-14	E-12	X	16-14	R-44	X	20-14	T-81		24-14	spare				X	A-14	E-55			
	14-15	E-33	X	16-15	E2154				X	24-15	E-21					A-15	spare			
X	14-16	E-55	X	16-16	E2165					24-16	E-33				X	A-16	S-33			
X	14-17	E-71	X	16-17	E-66				X	24-17	E-55				X	A-17	WT-31			
	14-18	E972	X	16-18	E-76				X	24-18	E-71				X	A-18	S-12			
	14-19	E2180	X	16-19	T-74					24-19	E972				X	A-19	E-12			
	14-20	E964	X	16-20	T-81					24-20	E2180				X	A-20	E-31			
X	14-21	E-45								24-21	E964					A-21	OES294			
	14-22	OES294								24-22	OES294				X	A-22	E941			
X	14-23	E941		<b>14' Ladders (cont.)</b>					X	24-23	E-74		<b>24' Ladders (cont.)</b>		X	A-23	E-41		<b>Attic Ladders (Cont.)</b>	
X	14-24	E-41	X	14-36	E-81				X	24-24	WT-37		24-36	Spare	X	A-24	E-74	X	A-36	E-42
X	14-25	E-21	X	14-37	E-83				X	24-25	WT-55		24-37	OTC	X	A-25	E-21	X	A-37	E-45
X	14-26	WT-37	X	14-38	spare PRA				X	24-26	WT-64		24-38	OTC	X	A-26	S-55	X	A-38	E-81
X	14-27	WT-64	X	14-39	E-87				X	24-27	E-37		24-39	OTC	X	A-27	T-74	X	A-39	E-83
X	14-28	E-271	X	14-40	E-82				X	24-28	E-25				X	A-28	SQ-25	X	A-40	E-82
X	14-29	E-44	X	14-41	E-281				X	24-29	E-26				X	A-29	E-64	X	A-41	E-281
X	14-30	SQ-25	X	14-42	Spare				X	24-30	T-74					A-30	Spare		A-42	OTC
X	14-31	E-37		14-43	Spare				X	24-31	E-81					A-31	E-33			
X	14-32	E-61		14-44	OTC				X	24-32	E-83				X	A-32	E-71			
X	14-33	R-64		14-45	OTC				X	24-33	E-82					A-33	E972			
X	14-34	E-72		14-46	OTC				X	24-34	E-281					A-34	E2180			
X	14-35	E-273		14-47	OTC					24-35	Spare PRA				X	A-35	E-63			

## **Repairs Made To Our Ladder Inventory**

During the Units testing, the following number of repairs/corrections were made to our inventory of ladders:

342 Heat Sensors replaced

37 sets of Reflective labels added

21 sets of electrical/angle labels added

14 length labels added

9 sets of loose feet tightened on attic ladders

7 lock assemblies replaced on extension ladders

4 Halyards replaced

3 Rungs needed replacement

2 Beams needed filing for burrs

1 Roof hook needed replacing

1 set of feet needed replacing

1 set of rivets needed replacing to tighten a support rung

## **Financial Impact to Perform Ladder Testing**

As you can imagine, testing our own ladders is time consuming for both the persons performing the tests as well as the engine companies as they rotate through the testing process. This cost incurrence is still a significant savings to our unit than to outsource the ladder testing process to an outside vendor. Following is a breakdown and comparison between both scenarios.

### Ladder testing within the unit:

This year we did a slightly different approach to ladder testing and separated it from pump testing. We were able to test an entire battalions worth of equipment in an 8-10 hour block (there is some variation between battalions and grouping some equipment geographically rather than by battalion for convenience). Eight battalions were completed in 9 days with an

average of 8 hours a day of man hours to perform the testing. There was no OT pay for engine movements as the staffing was all provided by on duty personnel or volunteers moving volunteer equipment.

*Total Cost= 72 Hours @ \$25/hr. = \$1800*

Ladder testing by an outside vendor:

Companies such as Failsafe generally charge between \$2.35 - \$2.50 /ft. of ladders being tested. For our unit, that would translate to approximately:

*Total Cost = 3021 feet of ladders X \$2.35 = \$7099.35*

As you can see by the comparison, \$1800 vs. \$7099.35 is a considerable savings to the unit by performing our own ladder testing services. This is further impacted and our savings increased by the fact that those ladders that need significant repairs can be retested by us whenever they are repaired and ready to be returned to service, whereas an outside vendor would require a minimum time block of chargeable service time to come back to inspect possibly just a few ladders. Another benefit is that we control the amount of deferred maintenance that is present in the ladders, or minimize it would be a better term. Truck 74 had been up until this year using an outside vendor for its ground ladders as a convenience when it was having its aerial tested (which we are not able to do) and this year Truck 74 had the single most needed repairs than any other piece of apparatus. This could be the result of heavy use on incidents and training but could also likely be the result of deferred maintenance from the outside vendor not making corrections when they were still minor. Additionally, Battalion 8 had been using an outside vendor up until this year as well as Paradise FD, and like Truck 74, they seemed to have more minor maintenance issues and label/heat sensor requirements than the average.

Here is a breakdown of costs associated with actual repairs or replacement of ladder testing equipment for this year's cycle:

Repair parts:	\$1140.60
Ladder testing equipment:	\$673.72
Budgeted Amount for Ladder Program:	<u>\$2,000.00</u>
Under Budget Amount :	\$185.68

## **The Units Ladder Program Moving Forward**

I believe that we are doing a good job of annually inspecting and maintaining our ladders to ensure that they are safe for use on the firegrounds. A consistent theme that is seen when performing unit wide testing is the increased need for station level cleaning/maintenance. Of the 143 ladders tested this year, 25 were identified as needing painting to come up to the level of our county marking requirements and 37 were missing reflective labels. This is a station level issue that could have been addressed well before ladder testing by station personnel. Also noted was the typical general dirtiness and non-lubricated state of many ladders. I know that they are exposed to dust and dirt regularly, especially those ladders that are bedded in an internal compartment, but there has to be a greater emphasis placed on serviceability and routine inspection/cleaning and lubricating by field personnel.

Another cost issue that can be addressed, or at the least reviewed, is the sheer number of ladders that we currently have on equipment other than first due fire engines and that we could see a cost savings to the unit by reducing that number. Any given fire incident with an unaugmented response has enough of a ground ladder complement to meet all operational needs with an excess of ladders still unused.

Feel free to forward any questions or concerns with this information to me directly.

Thank you,

Mike Waters, Fire Captain

Butte Unit Safety Officer