Facility Equipment Maintenance System (FEM)

2012 Locks Maintenance Workshop
Puducah, KY
29 Feburary 2012

Larry Homich

LRD Regional FEM Coordinator

24 May 2011

HQs Utilization, Maintenance Management Initiative

"Run-to-failure maintenance"
Corrective Maintenance

Breakdown maintenance

- High risk of secondary failure
- High production downtime
- Has Overtime Costs
- Potential Safety Hazards

+ Machines are not 'over maintained'
+ No condition monitoring related costs

"Fix it before it breaks"
Preventive Maintenance

Schedule maintenance
Historical maintenance
Calendar based maintenance

- Machines are repaired when there are no faults
- Repair often causes more harm than good
- There are still 'unscheduled' breakdowns

+ Maintenance is performed in controlled manner
+ Fewer catastrophic failures
+ Greater control over stored parts and costs
+ Unexpected machinery failure should be reduced

"If it Isn't broke, don't fix it"
Predictive Maintenance

Condition based maintenance

- High investment costs
- Additional skills required

+ Unexpected breakdown is reduced
+ Parts are ordered when needed
+ Maintenance is performed when convenient
+ Equipment life is extended

"Fix it at the right time"
Proactive Maintenance

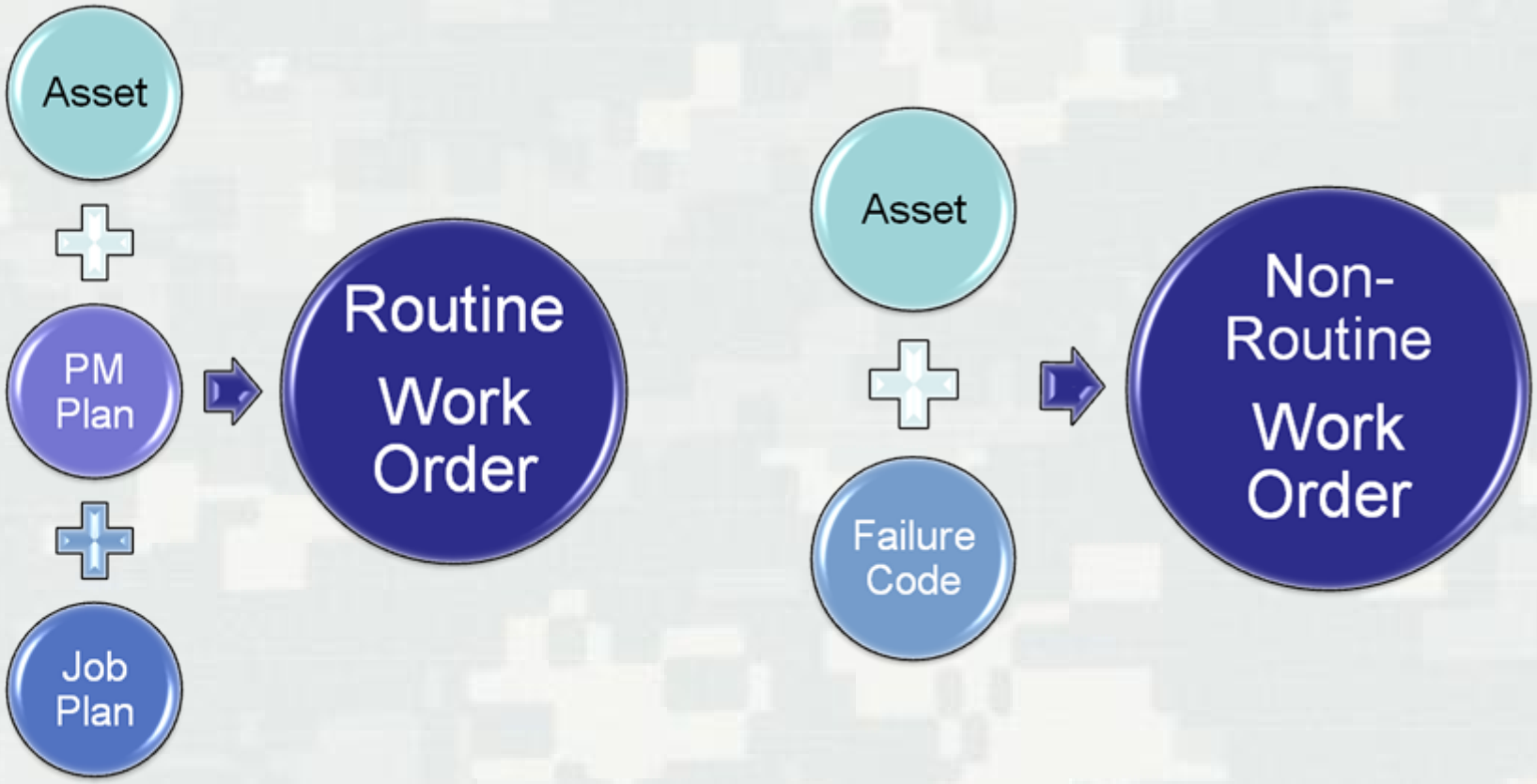
Prognostic maintenance
Reliability Centered maintenance

- High investment costs
- Additional skills required
- Additional time invested upfront
- Requires a change in philosophy from management and down

+ Equipment life is extended
+ Reduced downtime
+ Reduced overall maintenance costs
+ Improved equipment reliability
+ Fewer failures, thus fewer secondary failures

Ref: DoD Guidebook "Condition Based Maintenance Plus", May 2008

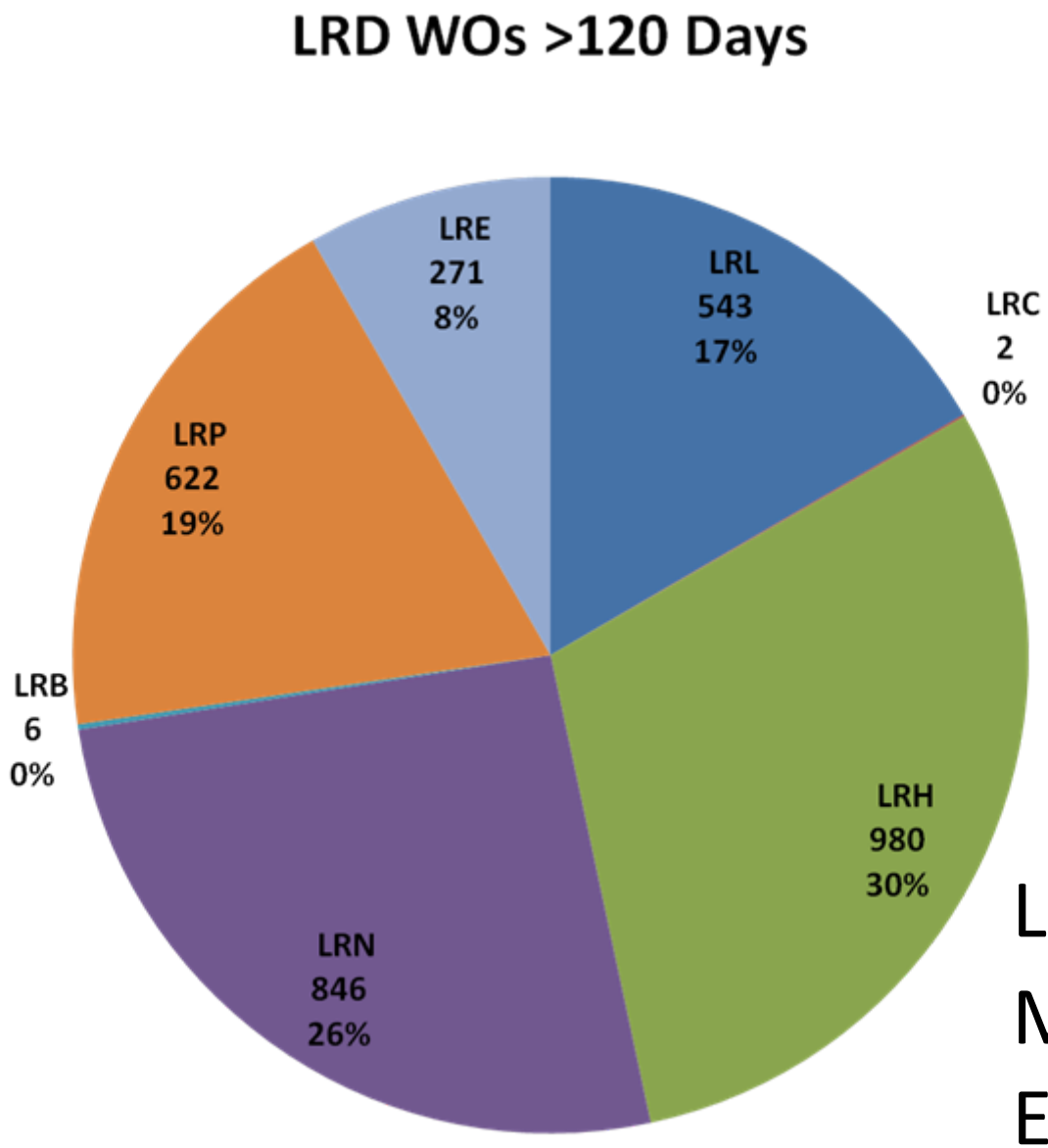
Review of FEM



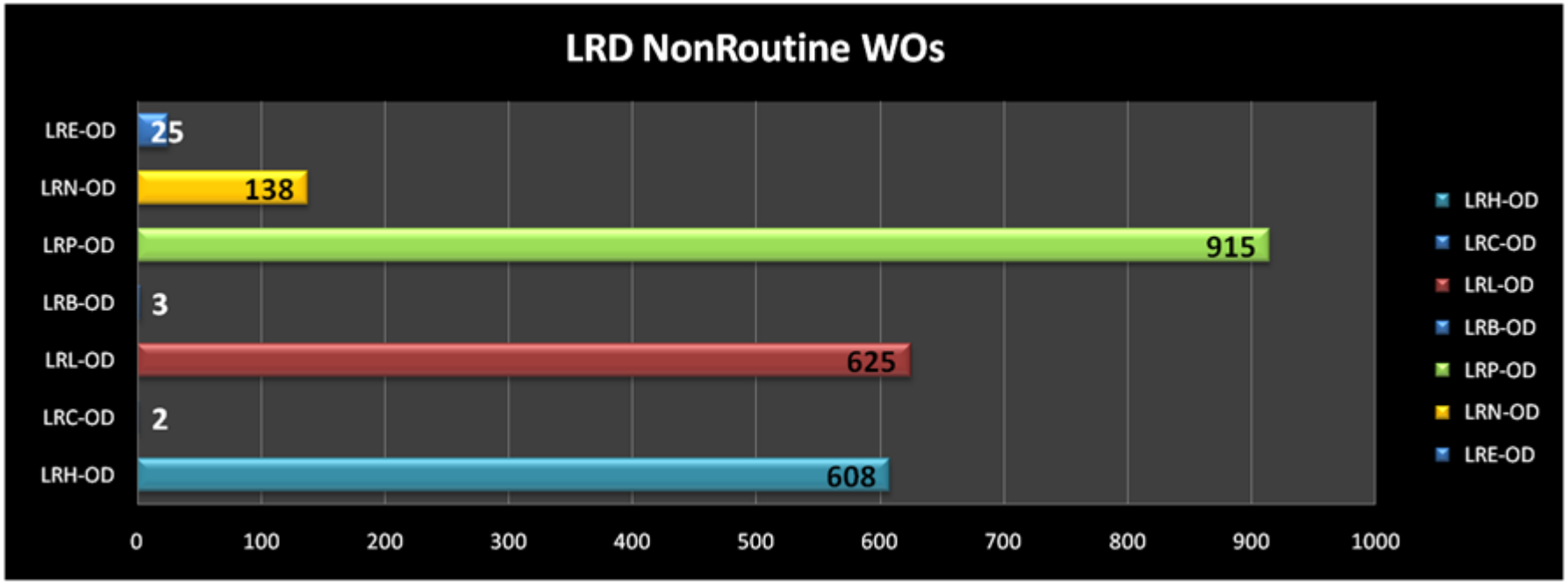
LRD FEM Status Overview

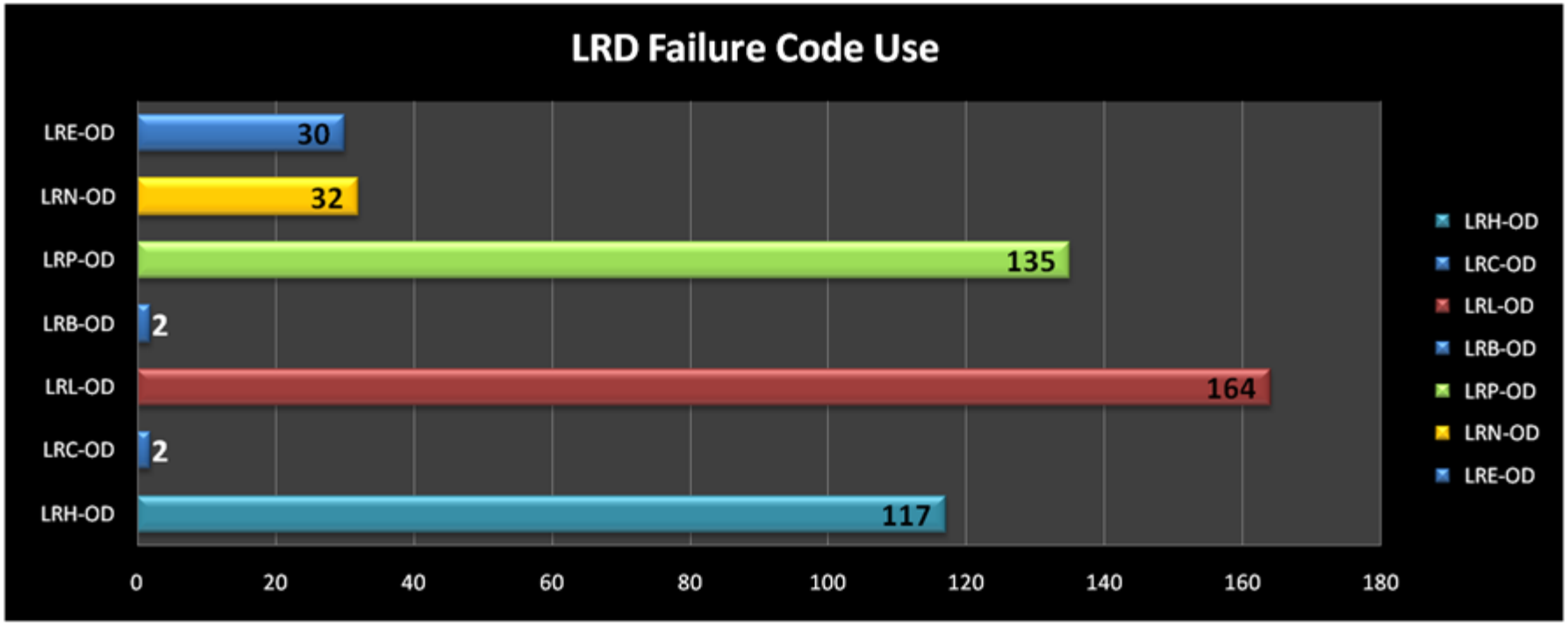
- The last LRD District that received initial FEM Training was 22 months ago, earliest was 32 months ago

- ~167,000 Work Orders, 95.1% are Routine



Labor
Money
Environmental
Process


LRD NonRoutine WOs
LRE-OD
LRN-OD
LRP-OD
LRB-OD
LRL-OD
LRC-OD
LRH-OD
25
138
915
3
625
2
608
0
100
200
300
400
500
600
700
800
900
1000
LRH-OD
LRC-OD
LRL-OD
LRB-OD
LRP-OD
LRN-OD
LRE-OD


LRD Failure Code Use
LRE-OD
LRN-OD
LRP-OD
LRB-OD
LRL-OD
LRC-OD
LRH-OD
30
32
135
2
164
2
117
0
20
40
60
80
100
120
140
160
180
LRH-OD
LRC-OD
LRL-OD
LRB-OD
LRP-OD
LRN-OD
LRE-OD

3.1 FEM utilization milestones (reference LRD FEM PgMP, 10 October 2010)

The following schedule applies to all business lines and repair parties in FEM:

For non-routine maintenance, within **1 year** of deployment of FEM:

- For all non-routine work orders, the Local Work Type will be selected that represents the purpose of the Work Order.
- Use of failure reporting is required on all work orders.
- While non-routine work orders will vary in terms of time to completion or repair, it is expected that actual labor and material data will be recorded upon close-out of the non-routine work order.

For routine maintenance, within **2 years** of FEM deployment:

- All job plans and PMs will be created and logged.
- All work orders should be completed after 120 days
- The closed work order should include recorded, actual labor and material data

Within **3 years** after the deployment of FEM, the asset hierarchy in FEM must align with the OCA effort for all assets with a condition code of C, D or F. Furthermore, assets with C, D or F condition codes must also have a correlating non-routine work order as well. Lastly, whenever OCA condition codes change FEM must be updated to reflect such changes.

Within **5 years** after the deployment of FEM, districts will canvas and identify historical maintenance records for replaced/repaired critical assets (critical assets are identified in Appendix H) and create a FEM non-routine work order for those assets. This action will assist risk and reliability activities for OCA.

Repair Station Non Routine Work Orders

MAXIMO - Work Order Tracking - Windows Internet Explorer

https://maximo.eis.ds.usace.army.mil/maximo/ui/startcntr?sc=1330445179035&event=loadapp&value=gditwotrac

File Edit View Favorites Tools Help

Favorites | Asset Management Links

MAXIMO - Work Order Tracking

Page Safety Tools

Work Order Tracking

Bulletins: (2) | Go To | Start Center | Profile | Sign Out | Help

ALLREPAIRJOBS | Find: | Select Action | Reports

List | Work Order | Plans | Related Records | Actuals | Safety Plan | Log | Failure Reporting

Advanced Search | Save Query | Bookmarks

Work Orders | Filter | 21 - 40 of 72 | Download

Work Order	Description	Reported Date	Asset	Crew	Lead	Status	LW Ty...	PM
10-9564	**Upper & Lower 600 Bottom Gate Latchers**	**03/17/2010 4:56:14:PM**	**H4LOHL02**	**PEWARS-MA**		**CLOSE**		
H4LOE10-9283	Replacment nut end Tension Bar	03/15/2010 4:25:3:PM	H4LOEL	PEWARS-WC	H4ORXGPB	CLOSE	BP	
10-7989	Man Basket (Bantam Crane)	03/09/2010 2:2:26:PM	H4LOHDCAS	PEWARS-ME		CLOSE		
09-7331	600 PUMPOUT REPLACE FLOATING MO...	03/05/2010 7:9:19:PM		PEWARS		CLOSE	BP	
09-7330	600 PUMPOUT SCREEN BARS (SEE LON...	03/05/2010 6:49:22:PM	H4LOPL02	PEWARS		CLOSE	BP	
09-7329	600 PUMPOUT HYDRAULIC PIPE WORK (...	03/05/2010 6:29:34:PM	H4LOPL02	PEWARS		CLOSE	BP	
09-7326	600 PUMPOUT GATE REPAIR (SEE LONG...	03/05/2010 5:25:6:PM		PEWARS		CLOSE	NR	
10-2738	Land wall filling valve and operating machin...	01/12/2010 6:38:39:PM	H4LM2LVTFL	PEWARS	H4ORWJRM	CLOSE	BP	
10-4763	East Branch Lake - Repair #1 Gate Stem & ...	11/09/2009 8:58:46:PM	H4NEDG	PEWARS		CLOSE	BP	
H4SL09-1839	Cable reels	08/23/2009 12:26:18:PM	H4SLDC	PEWARS-ME		CLOSE	BP	
11-1323	LA 9 REPAIR VALVE INTERLOCKS	06/16/2009 2:3:23:PM	H4LA9LM	PEWARS-EC		CLOSE	BP	
11-1322	LA 9 ELECTRIC HYDRAULIC PUMPS	06/16/2009 1:57:17:PM	H4LA9XC	PEWARS-MA		CLOSE	BP	
11-1319	LA 9 DEWATER LOCK CHAMBER/REPAIR/...	06/15/2009 5:54:41:PM	H4LA9L01S	PEWARS-MA		CLOSE	BP	
11-1318	LK7 RENOVATE DS GATE GATE MACHIN...	06/15/2009 5:33:38:PM	H4LA7L01GS	PEWARS-MA		NOLAB	BP	

Done | Local intranet | Protected Mode: Off | 165%

Work Order: Replacement Nut End Tension Bar

MAXIMO - Work Order Tracking - Windows Internet Explorer

https://maximo.eis.ds.usace.army.mil/maximo/ui/startcntr?sc=1330445179035&event=loadapp&value=gditwotrac

File Edit View Favorites Tools Help

Favorites | Asset Management Links

MAXIMO - Work Order Tracking

Page Safety Tools

Work Order Tracking

Bulletins: (2) | Go To | Start Center | Profile | Sign Out | Help

ALLREPAIRJOBS | Find: | Select Action | Reports

List | Work Order | Plans | Related Records | Actuals | Safety Plan | Log | Failure Reporting

Work Order	H4LOE10-9283	Replacment nut end Tension Bar	Status	CLOSE	USACE Org Co
Parent WO			Status Date	04/02/2010 1:8:6:PM	S
Asset	H4LOEL	LOE Lock	Failure Class		Attachmen
Location	LRPO-LOE-L	Emsworth L&D Lock	Problem Code		Inherit Status Change
Physical Location			Class	WORKORDER	Accepts Charge
Classification			Has Tasks and/or Children?	☐	Is Tas
Description					

Work Types

Corporate Work Type	M
Command Work Type	RM
Local Work Type	BP
Work Order Type	SWO

Charge Codes

Revolving Fund?	☐
PMBP Project Code	
Ordering Work Item	
Labor Code	

Reported By

Reported By	H4ORXGPB	BROWN JR, GORDON P
Reported Date	03/15/2010 4:25:3:PM	

Responsibility

Crew	PEWARS-WC	PEWARS Welders (
Supervisor	H4ORXIMM	MCKELVEY, IAN M

Done | Local intranet | Protected Mode: Off | 165%

Copy Paste Example of Work Detail in Work Order

MAXIMO - Work Order Tracking - Windows Internet Explorer

https://maximo.eis.ds.usace.army.mil/maximo/ui/startcntr?sc=1330445179035&event=loadapp&value=gditwotrac

File Edit View Favorites Tools Help

Favorites | Asset Management Links

MAXIMO - Work Order Tracking

Page Safety Tools

Work Order Tracking | Sign Out | Help

ALLREPAIRJOBS | Find

List | Work Order

Work Order: H4LOE10
Parent WO:
Asset: H4LOEL
Location: LRPO-LO
Physical Location:
Classification:
Description:

USACE Org Co
S
Attachmen
Inherit Status Change
Accepts Charge
Is Tas

Work Types

Reported By

Reported By: H4ORXGPB
Reported Date: 03/15/2010 4:

PEWARS Welders (
MCKELVEY, IAN M

Long Description

Replacment nut end Tension Bar

CELRP-EC-NC 2 April 2010

MEMORANDUM FOR: Files

SUBJECT: Emsworth L/D, Ohio River ' Repair Diagonal (Tension Bar) on DSLW Gate

1. An emergency inspection was conducted on the DSLW gate at Emsworth on 12 March 2010. The downstream diagonal that runs from the top quoin end to the bottom middle end of the gate was broken. The break was just below the top nut on the diagonal. Steve Stoltz, Bob Burstynowicz, Jim Williams and Bob McTighe inspected the break. The chamber was closed until the inspection could determine if the gate could be used for operation.

2. A decision was made to continue using the gate until the Repair Party could replace the broken end of the diagonal. The lock personnel were instructed to open and close the gate as slow as possible to avoid flexing the gate when swinging in the water.

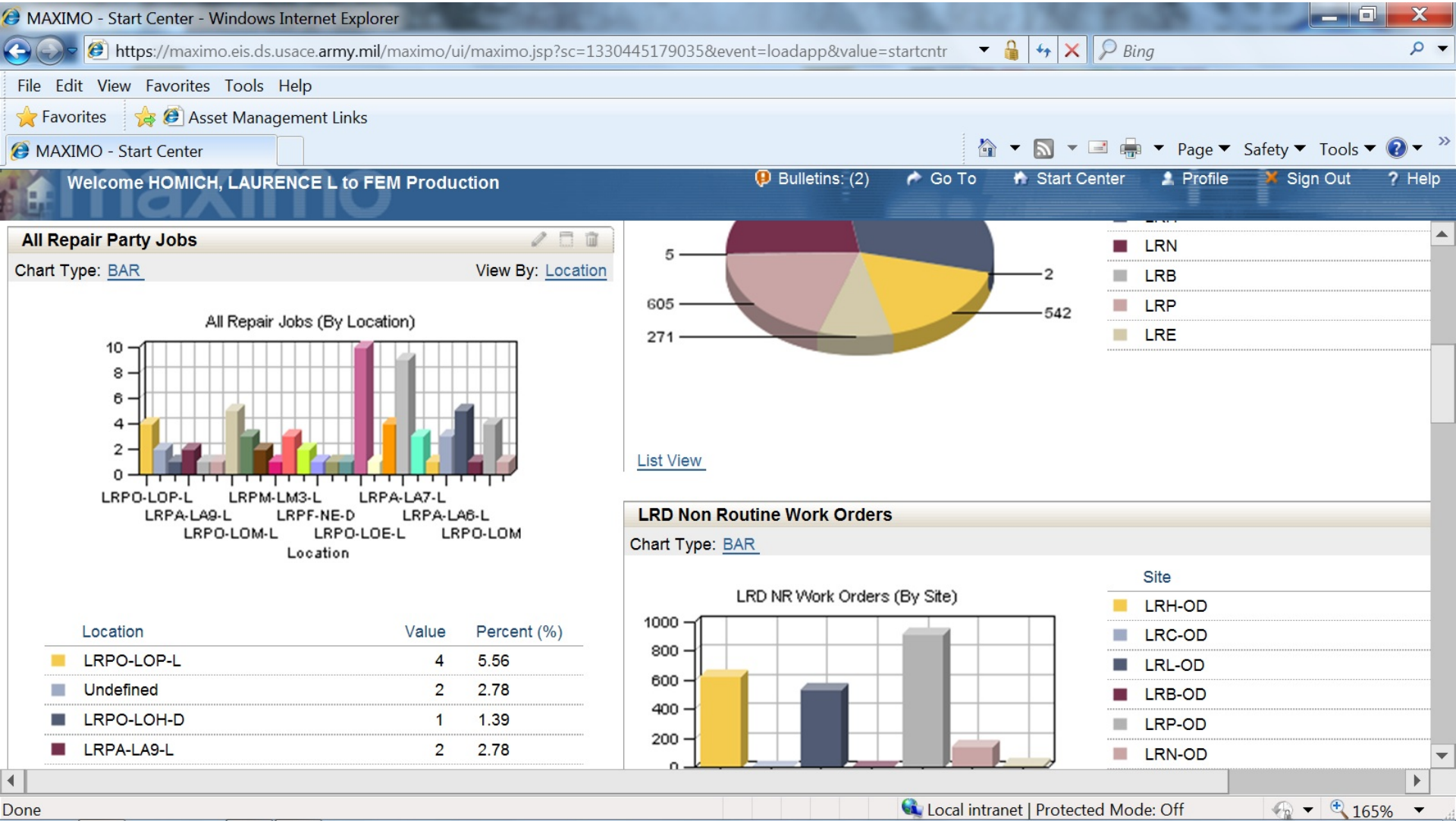
3. The Repair Party replaced the top 9-1/2 feet of the diagonal during two 8-hour shutdowns on 30-31 March 2010. The nut on top of the diagonal was tightened with a crane using a wrench. The old section that was removed where the break occurred will be tested to determine if the material meets the specifications on the drawings (ASTM A592 Grade F). The labor and plant used are listed below:

Labor:
Jack Kinneman
Ben Heisel

OK | Cancel

Done | Local intranet | Protected Mode: Off | 165%

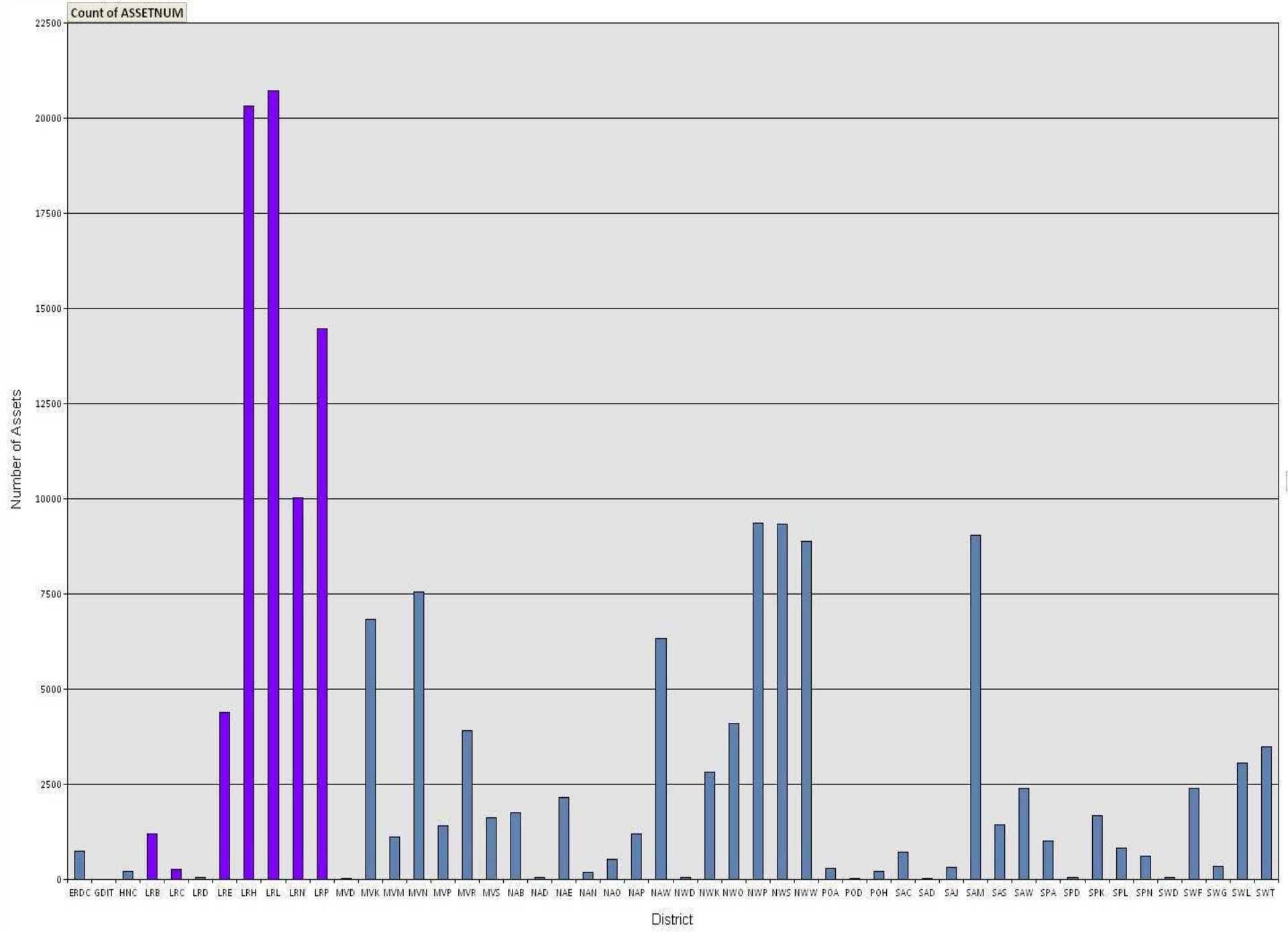
Graph Showing All Repair Party Work Orders by Location



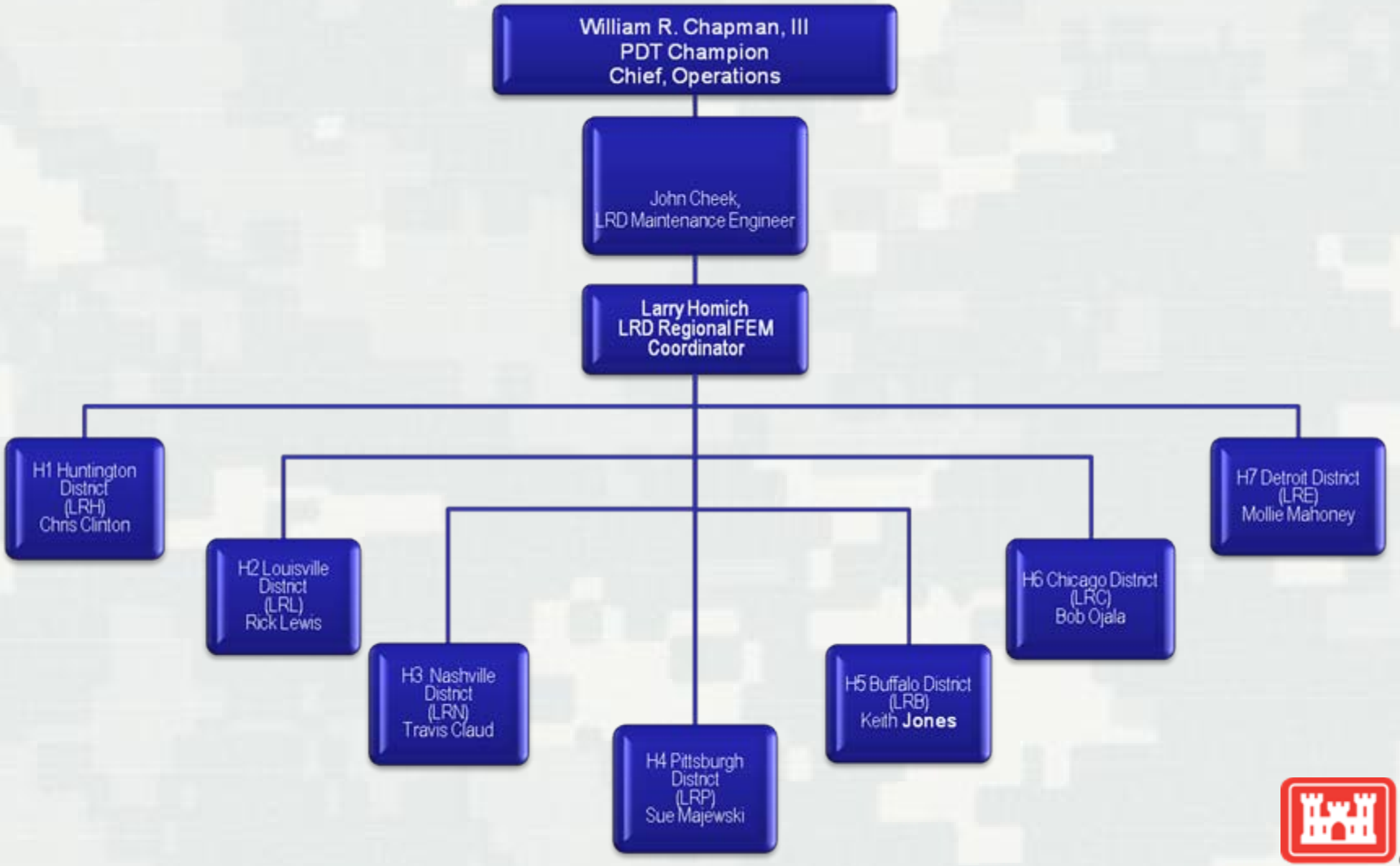
Current Efforts

- QA/QC – Job Plans, Preventive Maintenance Plans, Work Orders that are in FEM
- Fleet and Repair Station: Review/Build Asset Hierarchy, Job and Preventive Maintenance Plans
- Process for Inspections
- Build relationship between OCA and FEM

Drop Filter Fields Here



LRD FEM PDT Members



Make FEM work for U

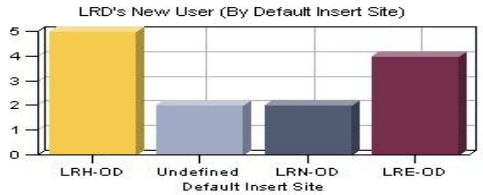
Welcome HOMICH, LAURENCE L to FEM Production

Bulletins: (4) | Go To | Start Center | Profile | Sign Out | Help

Change Content/Layout | Display Settings | Update Start Center

New Users

Chart Type: BAR — View By: Default Insert Site



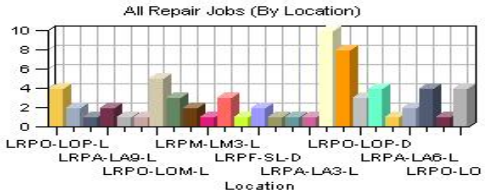
Default Insert Site	Value	Percent (%)
LRH-OD	5	38.46
Undefined	2	15.38
LRN-OD	2	15.38
LRE-OD	4	30.77

List View

Blocked Users

All Repair Party Jobs

Chart Type: BAR — View By: Location



Location	Value	Percent (%)
LRPO-LOP-L	4	5.88
Undefined	2	2.94
LRPO-LOH-D	1	1.47
LRPA-LA9-L	2	2.94
LRPA-LA9-X	1	1.47
LRPA-LA2-L	1	1.47
LRPO-LOM-L	5	7.35
LRPM-LM2-L	3	4.41
LRPF-NWW-D	2	2.94
LRPM-LM3-L	1	1.47
LRPA-LA8-L	3	4.41
LRPF-NE-D	1	1.47
LRPF-SL-D	2	2.94
LRPF-NK-X	1	1.47

LRD WOs >120 Days Old

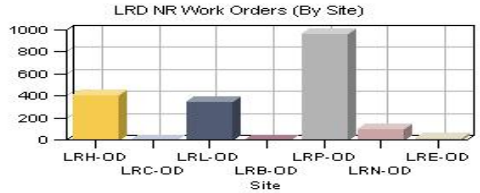
Chart Type: BAR — View By: Organization

Organization	Value	Percent (%)
LRL	467	14.63
LRC	2	0.06
LRH	1613	50.52
LRN	572	17.91
LRB	18	0.56
LRP	307	9.61
LRE	214	6.7

List View

LRD Non Routine Work Orders

Chart Type: BAR — View By: Site



Site	Value	Percent (%)
LRH-OD	411	22.14
LRC-OD	2	0.11
LRL-OD	354	19.07
LRB-OD	3	0.16
LRP-OD	970	52.26
LRN-OD	98	5.28
LRE-OD	18	0.97

List View

LRD WO - Current Month Work Orders

Chart Type: BAR — View By: Site

Site	Value	Percent (%)
LRH-OD	388	30.92
LRL-OD	186	14.82
LRB-OD	6	0.48
LRP-OD	312	24.86
LRN-OD	358	28.53
LRE-OD	5	0.4

List View

LRP BP WO-Budget Package Work Orders

LRD Standing Work Orders (Not Closed)

Chart Type: BAR — View By: Site

Questions?

- National FEM Support SharePoint Website - https://kme.usace.army.mil/CoPs/AMC/FEM/default.aspx

  Status of FEM database
  Library of FEM Manuals
  Links to FEM Production (Internet and Citrix) and Training Database (Citrix)

- LRD FEM SharePoint Website – https://kme.usace.army.mil/LRD/FEM/default.aspx

  LRD FEM PgMP, updates, links.