

	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES		POLICY AND PROCEDURE NUMBER 11.04.012	PAGE 1 of 9
	Policy and Procedure		EFFECTIVE DATE June 30, 2000	
SUBJECT Equipment Downtime Reporting		SUPERSEDES DPDR 11.04.012	DATED 12/15/1993	
TITLE State Equipment Fleet	CHAPTER Equipment Use, Care and Maintenance	APPROVED BY <p style="text-align: center;">Signature on File</p>		

PURPOSE AND SCOPE

Introduction:

Reliability of equipment is of paramount importance to the State. One method used to determine the reliability of equipment is to measure the amount of time it is available for service as a percent of the total time in the period. This ratio of available time to total time in the period is referred to as the Reliability Ratio (RR).

It is the policy of State Equipment Fleet to require minimum levels of reliability from owned or leased equipment. Equipment must be capable of meeting the acceptable reliability standards stated in this procedure. Reliability shall be considered acceptable unless excessive unit failure as defined in this procedure is experienced.

Responsibility/Performance:	
Regional Equipment Managers:	Ensure adherence to this procedure.
SEF Headquarters Staff:	Maintain Reliability Ratio information when necessary to monitor equipment reliability.
User Groups:	Maintain required downtime information.

Definitions:

Reliability Ratio (RR)

The mathematical ratio of machine available time to the total time in the period.

Available Time

Days in a Month (DM) minus Days Out of Service (DO)

Available Time (Month) = DM – DO

Or

Days in a Year (DY) minus Days Out of Service (DO)

Available Time (Year) = DY - DO

Seasonal Period

Contiguous days stated in the machine contract specifications that the machine is needed for seasonal use.

Off-Season Period

Contiguous days stated in the machine contract specifications that the machine is not needed for seasonal use.

Machine Failure

Any and all loss of capability to perform fully, as required, that is not attributed to Conditioned Failure.

Conditioned Failure

Any machine failure attributable to accident, operator abuse, or other external cause not directly attributable to the machine itself.

Downtime

Downtime is machine failure that is caused by breakdown or malfunction resulting from inherent or other deficiencies attributable to the machine itself which causes the machine to not be available for use.

DISTRIBUTION

All holders of the Procedure Manual; all SEF Procedure Manual holders; and Region Managers.

PROCEDURE**A. Acceptable Reliability.**

1. Reliability will be measured only for the intended application of the machine, during any consecutive 12-months of the warranty period for cumulative reliability, and/or during any calendar month of the warranty period for seasonal/off season reliability. Machine reliability will be monitored in accordance with this procedure.
2. Acceptable reliability is achieved when a machine experiences or maintains a Reliability Ratio (RR) equal to or exceeding:
 - A 90 percent (0.90) RR during any consecutive 12 months (365 days) during the warranty period.
 - A 75 percent (0.75) RR per month (defined by calendar days) during the seasonal period in the consecutive 12 month period.
 - A 65 percent (0.65) RR per month (defined by calendar days) during the off season period in the consecutive 12 month period.

- RR below the stated percentages does not meet minimum reliability requirements for state owned equipment.

B. Calculation of Reliability Ratio (RR)

RR is the mathematical ratio of available time (in days) to total time in the period. The RR will be calculated according to the following formula:

$$\text{RR} = \frac{\text{Days in a Month Minus Days Out of Service}}{\text{Days in a Month}} \quad \text{or} \quad \text{RR} = \frac{\text{DM} - \text{DO}}{\text{DM}}$$

Or

$$\text{RR} = \frac{\text{Days in a Year Minus Days Out of Service}}{\text{Days in a Year}} \quad \text{or} \quad \text{RR} = \frac{\text{DY} - \text{DO}}{\text{DY}}$$

Note: Fractional days apply. A unit that is out of service 8 hours in a 24-hour period would be out of service 0.33 days. A day is the 24 consecutive hours from 12:00 AM to 12:00 AM.

Example: 30 days in month = DM with 2 days plus 8 hours out of service = DO would result in the RR of:

$$\text{RR} = \frac{30 - 2.33}{30} = 0.92$$

C. Machine Failure and Downtime

Downtime is not counted for scheduled maintenance, preventive maintenance, scheduled major overhauls, for damage as the result of operator abuse or machine misapplication, or for damage as the result of accident or forces of nature.

D. Measuring Downtime

Downtime resulting from machine failure is the actual number of hours a machine is out of service as recorded on the Out of Service Report (OSR). Hours of downtime are converted to 24-hour days before the RR is computed.

- Out of Service Report (OSR):

All downtime will be recorded on an Out of Service Report (OSR), which will be produced for each occurrence of downtime. The OSR will record the date and time a unit went down, the location where the machine is based, the reason the machine is down, date and time the vendor was notified (if applicable), the date and time the machine was returned to service, and the total hours of downtime.

Out of Service Reports will be finalized and approved by the appropriate District SEF Manager. Copies of OSR's will be forwarded to SEF Headquarters, and will be available to the representing vendor and manufacturer.

2. Downtime Basis:

Downtime resulting from machine failure is the actual number of days or partial days a machine is out of service. This will include:

- Actual shop hours and/or field repair hours required to return the unit to full operational status following machine failure, including trouble-shooting, repair, necessary replacement of parts, and necessary adjustments, plus:
- Time lost waiting for parts and/or vendor assistance. "Waiting time" downtime also applies if need for the parts/assistance is discovered during routine maintenance and a return to service is deemed counterproductive. In this case the "waiting time" clock begins with notice of the need to the vendor. An allowance may be considered in "waiting time" calculations if arrival of parts/assistance is delayed by transportation shutdown to include verifiable transportation scheduling difficulties such as infrequent flights and only if alternatives have been exhausted. Parts/assistance are to be provided by the quickest means possible to avoid unnecessary delays and downtime.

E. Documentation of Downtime.

1. Responsibility for Keeping Records:

Adequate records of downtime resulting from machine failure will be kept. It will be the responsibility of the Regional SEF Manager to coordinate with the user groups to ensure downtime reporting is properly done and submitted at least monthly. It will be the responsibility of SEF Headquarters to summarize field downtime reports, perform appropriate Reliability Ratio analysis, and work with the vendors and manufacturers in those instances where machines fail to meet the minimum RR standard.

2. Designated Equipment:

Downtime documentation will be kept for designated equipment, as determined by SEF Headquarters and the SEF Regions. Either SEF HQ or the SEF Regions may designate a piece of equipment, or a group of equipment, for downtime documentation. Equipment may be designated for downtime tracking for the following reasons:

- As the result of a bid requirement.

- To verify the performance of equipment new to the state's inventory.
- Reevaluation of a machine or group of machines that has had a poor RR.
- To document RR for machines that appear to have excessive downtime.
- For comparative evaluation purposes when assessing purchase options.
- For other reasons as determined by either Regional SEF or Headquarters SEF.

3. Required Records

At a minimum the following records will be kept to record and document downtime and ongoing RR.

- Out of Service Report (OSR) (Attachment A). Used by field personnel to record downtime on individual pieces of equipment.
- Monthly Reliability Ratio (RR) Report (Attachment B). Used by SEF Regional personnel to report the RR of designated equipment within their jurisdiction.
- Reliability Ratio (RR) Log (Attachment C). Used by SEF Regions to record the ongoing RR of designated equipment within their jurisdiction.
-

4. Distribution of Records

Once the documentation of downtime for a unit has begun for any consecutive 12-month period, the SEF Contracting Officer will be notified and copies of the documentation will be forwarded to SEF headquarters. The documentation will describe machine failures that have resulted in the unit being out of service as defined in this procedure. Notification will also be made to the vendor within one week. Copies of the OSR's will be made to the vendor upon request.

F. Liquidated Damages

Failure of a unit to meet the RR as defined in this procedure will result in liquidated damages being assessed against the responsible vendor in the amount of 0.1 percent (0.001) of the unit price per day (24 hours of downtime) that the unit was down in excess of the allowable time during the warranty period. Fractional days during a month or year are cumulative and will be charged accordingly.

Example:

Equipment Cost = \$165,000

$$\text{RR for one month (off season)} = \frac{30 \text{ DM} - 15.33 \text{ DO}}{30 \text{ DM}} = 0.48$$

Required RR (off season) = 0.65

Allowable days DO (off season) = $30 \text{ DM} \times (1 - 0.65) = 10.5 \text{ DO}$

Liquidated damages = $\$165,000 \times 0.001 \times (15.33 - 10.5) = \796.95

$$\text{RR for 12 consecutive months} = \frac{365 \text{ DY} - 52 \text{ DO}}{365 \text{ DY}} = 0.858$$

Required one year RR = 0.90

Allowable days DO (one year) = $365 \text{ DY} \times (1 - 0.90) = 36.5 \text{ DO}$

Liquidated damages = $\$165,000 \times .001 \times (52 - 36.5) = \$2,557.50$

G. Billings for Liquidated Damages

The Regional SEF offices will do Billings for liquidated damages in the same manner as warranty billings. Questions regarding calculations, disputed billings, and RR standards will be addressed to the SEF Contracting Officer.

Attachments:

- A. Out of Service Report (OSR)
- B. Monthly Reliability Ratio (RR) Report
- C. Reliability Ratio (RR) Log

OUT OF SERVICE REPORT (OSR)

Equipment No. _____	Make & Model _____
Serial No. _____	Meter Reading _____

<u>OUT OF SERVICE</u>	Reason out of Service: _____
Date _____	_____
Time _____	_____

<u>BACK IN SERVICE</u>	Comments: _____
Date _____	_____
Time _____	_____

<u>DAYS OUT OF SERVICE</u>	Date _____
Total Days _____	Completed by _____

<u>VENDOR CONTACT</u>	Date _____	Time _____
Vendor Response: _____	_____	
_____	_____	
Parts Ordered _____	Date _____	Time _____
SEF District Manager Approval _____	Date _____	

