

# SPRING OPERATION SEMINAR

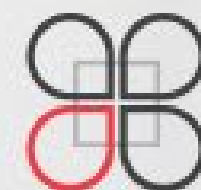
MARCH 24  
2022

SCARBOROUGH  
CONVENTION CENTRE  
20 TORHAM PLACE, SCARBOROUGH, ON

Asphalt.

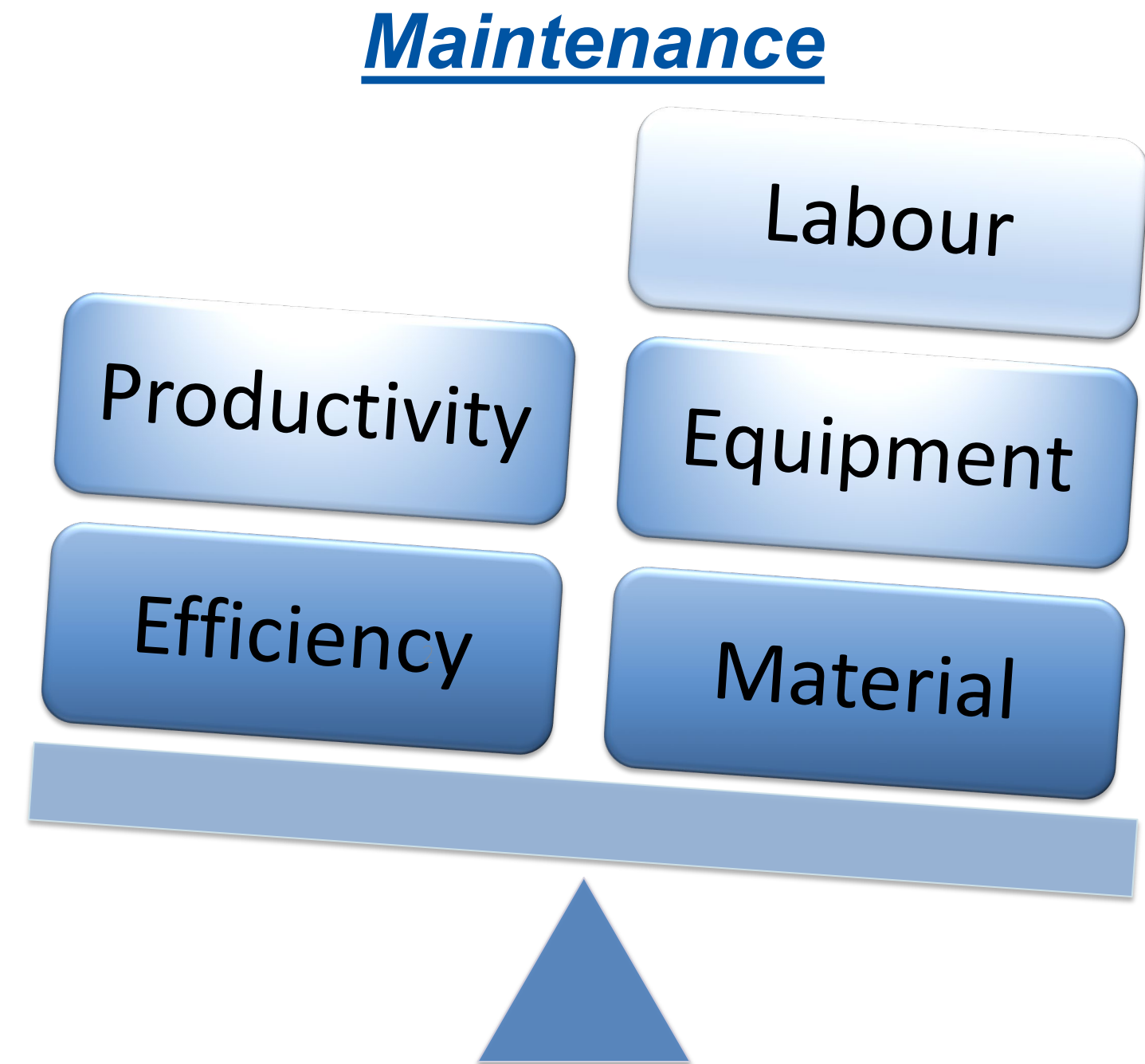
ONTARIO RIDES ON US

ORBA

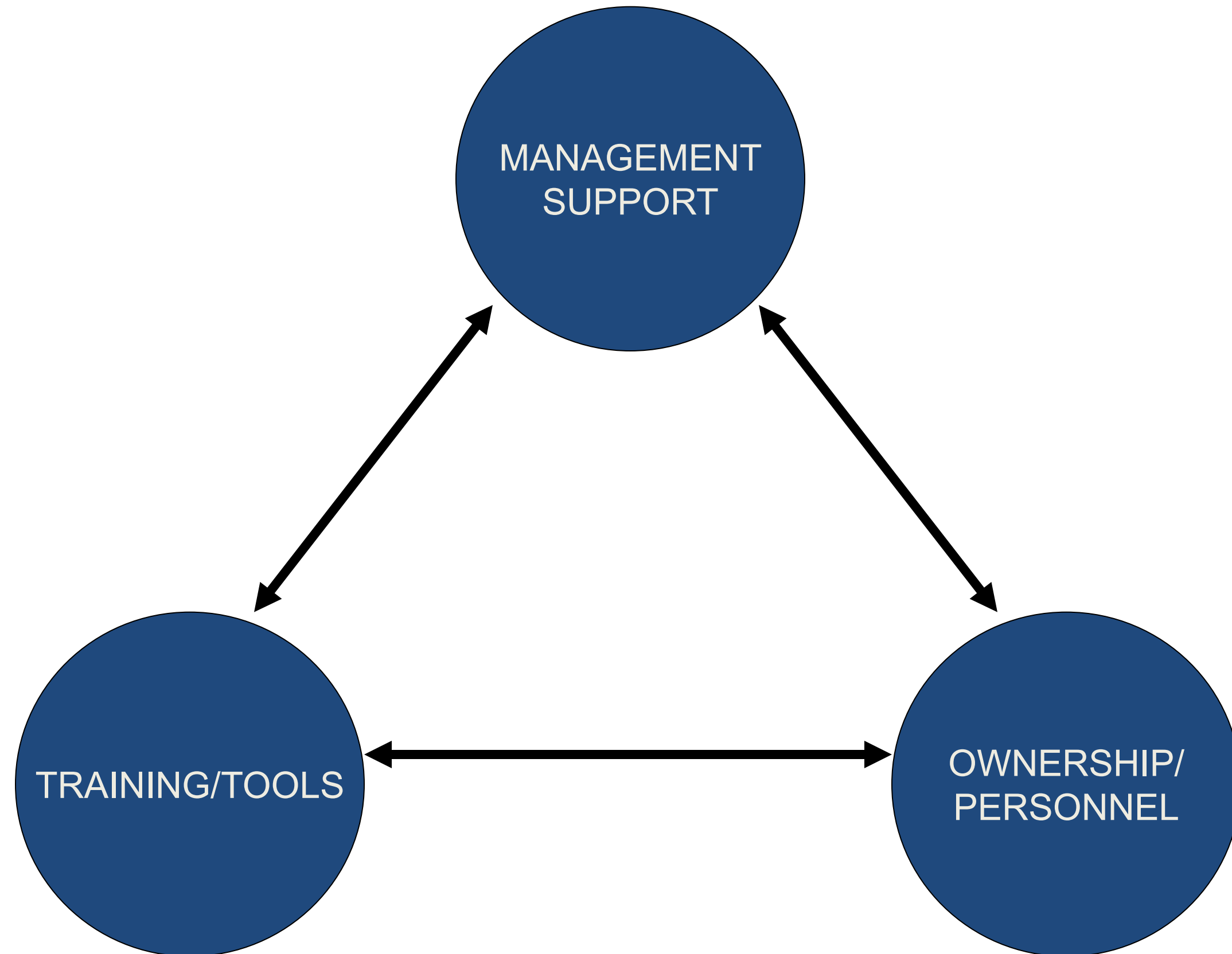


# ASPHALT PLANT AND EQUIPMENT

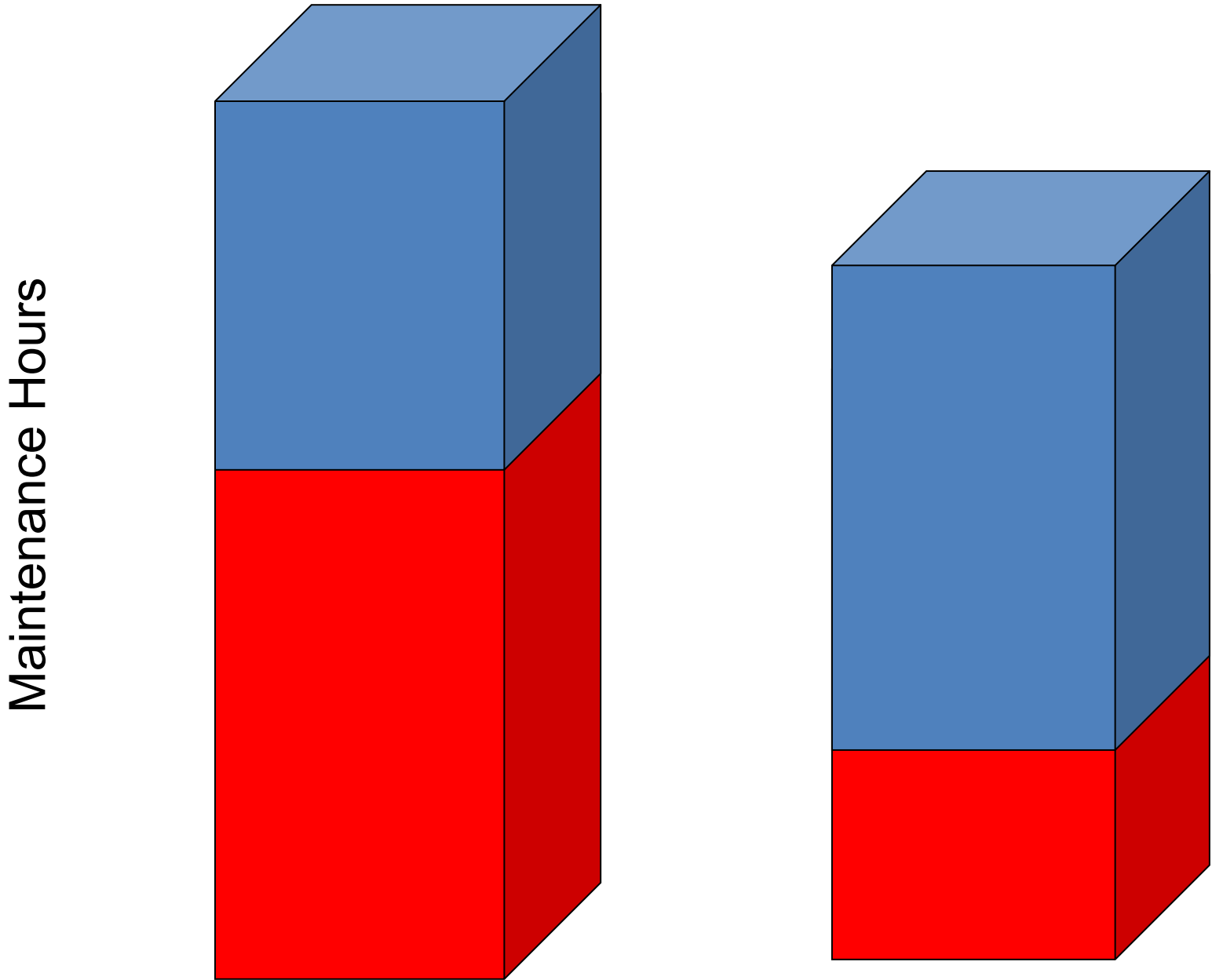
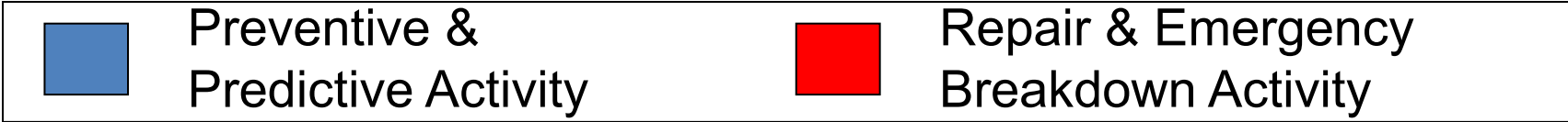
- Cold feed bins
- Stockpiles
- Loaders
- Trucks
- Drum/dryer
- Batching tower
- Silos
- Stacks
- Baghouse/Filters
- Pumps
- Conveyors
- Pipes, Valves, etc
- Laydown Equipment



# THREE PILLARS OF MAINTENANCE

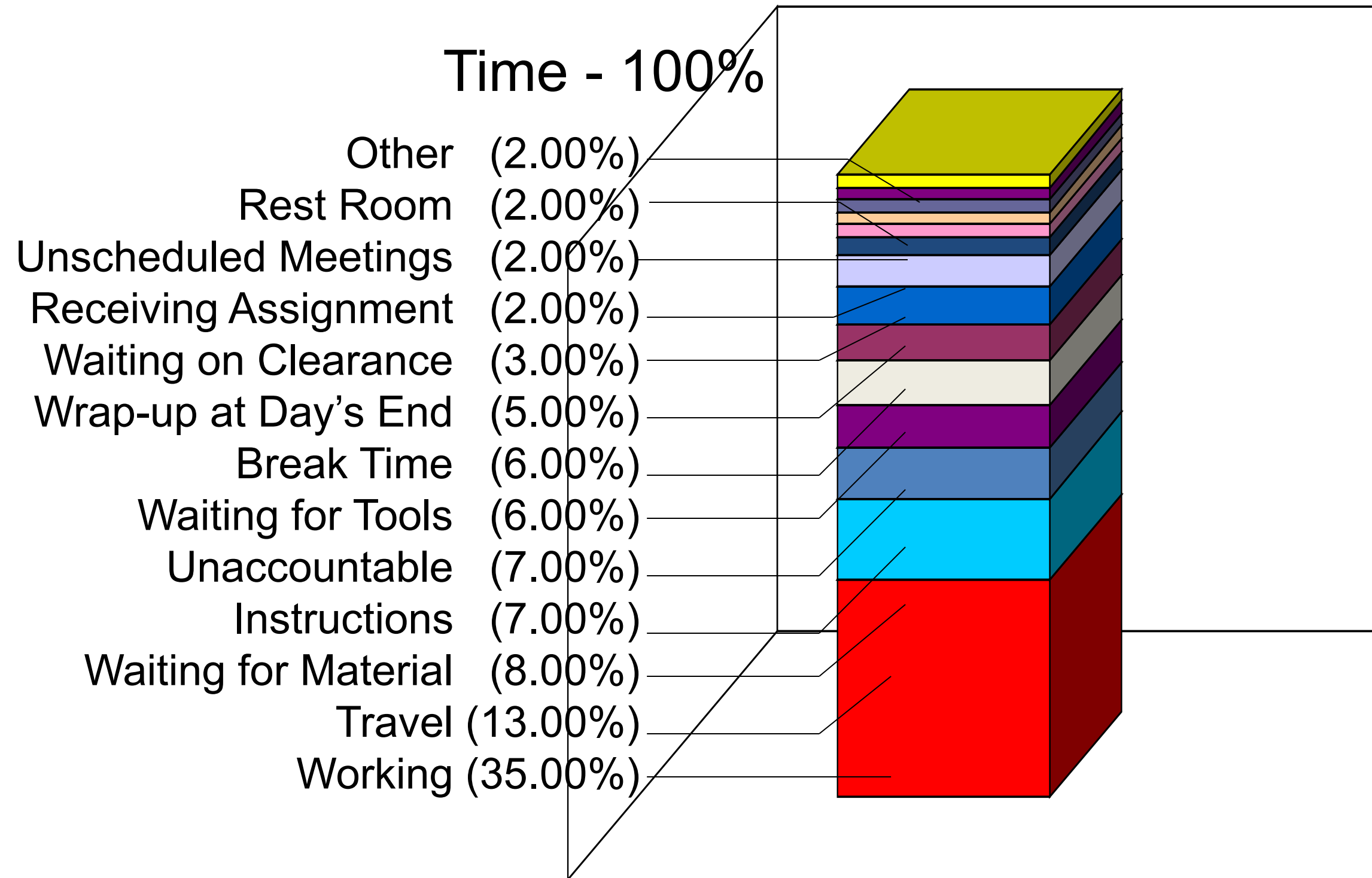


# MAINTENANCE ACTIVITY SHIFT



*“Minimize Downtime while Maximize Productivity”*

# DISTRIBUTION OF MAINTENANCE TIME



\* As per Lincoln Bearing Saver

CURRENT LUBRICATION METHOD COSTS



**LOST PRODUCTION DUE TO BEARING RELATED FAILURES:** Cost incurred when unexpectedly "shutting down" a machine or area due to a bearing related failure.

Hourly Production Rate	Hours Down/Year	Estimated total/Year
\$0.00	0	\$0.00
\$0.00	0	\$0.00
\$0.00	0	\$0.00
\$0.00	0	\$0.00



**LOST PRODUCTION DUE TO A SHUTDOWN FOR MANUAL LUBRICATION:** The cost incurred for shutting down a machine or production line due to manual lubrication requirements.

Hourly Production Rate	Hours Down per Month to Lubricate	Months/Year	Estimated Total/Year
\$0.00	0	12	\$0.00
\$0.00	0	12	\$0.00
\$0.00	0	12	\$0.00
\$0.00	0	12	\$0.00



**ANNUAL LABOUR COST FOR MANUAL LUBRICATION:** The direct and indirect time to dispense grease to lubrication points including: filling a grease gun or bucket pump, travel time from supply area to bearing points, removing guards and covers, climbing up and over machinery, paid breaks and mealtime.

Hourly Rate of Lubrication Personnel	# of Hours to Lube/Week	Weeks/Year	Estimated Total/Year
\$0.00	0	52	\$0.00
\$0.00	0	52	\$0.00
\$0.00	0	52	\$0.00
\$0.00	0	52	\$0.00



**ANNUAL REPLACEMENT BEARING LABOUR:** Labour cost relative to replacement of bearings and related materials including: travel time from the storage area to replacement point, labour cost to remove old bearing and replace with new, any support help such as a crane operator to support shaft.

Hourly Rate of Maintenance Personnel	Failures/Year	Hours for each Repair	Estimated Total/Year
\$0.00	0	0	\$0.00
\$0.00	0	0	\$0.00
\$0.00	0	0	\$0.00
\$0.00	0	0	\$0.00





### ANNUAL REPLACEMENT BEARING COST:

Cost for replacement bearings and related materials including: bearing cost (includes acquisition, handling and inventory costs), other items damaged by failures. Examples: bearing shafts, bearing seats, conveyor belts, etc.

Cost per Failure	Bearing Failures/Year	Estimated total/Year
		\$0.00
		\$0.00
		\$0.00
		\$0.00



### ANNUAL LUBRICANT COST:

Cost of lubricant, drum disposal, acquisition cost, and storage/handling.

Lubricant Cost per Container	Containers used per Year	Estimated total/Year
\$0.00	0	\$0.00
\$0.00	0	\$0.00
\$0.00	0	\$0.00
\$0.00	0	\$0.00

### ADDITIONAL COSTS

The following are additional costs related to the manual lubrication method on the #. These costs are easily "hidden" in the cost of manufacturing and are difficult, if not impossible, to obtain a specific dollar value for.



### ANNUAL CLEANUP COST DUE TO OVER LUBRICATION:

The method of measuring lubricant dispensed to a bearing when lubricating manually is generally done visually. When lubricant is visually seen at the bearing deals, it is considered lubricated. This amount of lubricant is 2 to 3 times more than the bearing actually needs. the excess lubricant is generally found on the ground or the effluent.

Hourly Cost of Maintenance Personnel	Hours per month to Cleanup Excess Lubricant	Months per Year	Estimated Total per Year	
\$0.00	0	12		\$0.00
\$0.00	0	12		\$0.00
\$0.00	0	12		\$0.00
\$0.00	0	12		\$0.00



### ANNUAL MACHINE REBUILD COST:

Cost of rebuilding a machine due to normal wear from the current lubrication method.

Cost of Machine Rebuild	Years between Rebuilds	Estimated Total/Year
\$0.00	0	\$0.00
\$0.00	0	\$0.00

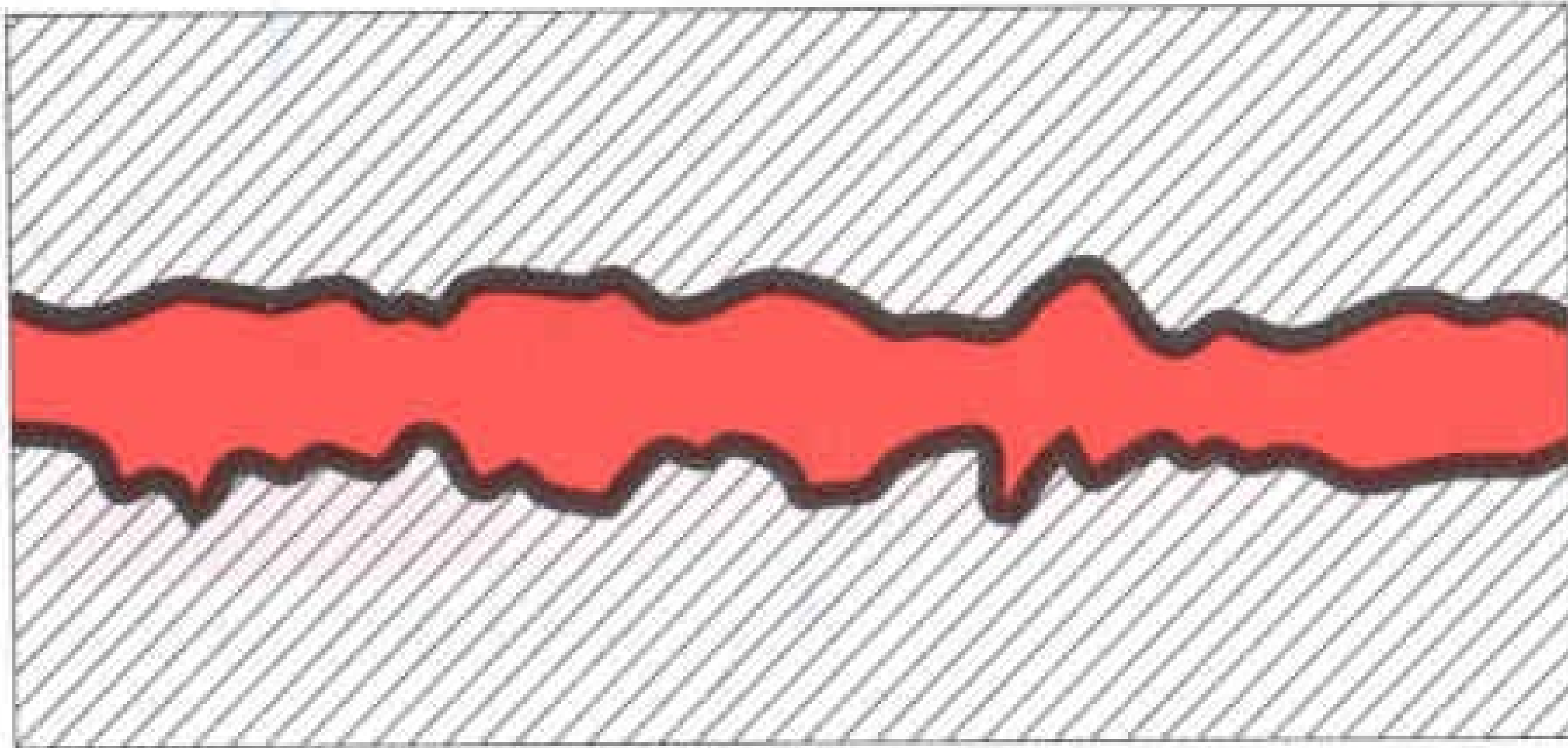
# Functions of Lubrication

- Reduce Friction
- Reduce Wear
- Helps Dampen Shock or Absorb Shock
- Reduce Temperature
- Minimize Corrosion
- Seal out Contaminants





# Lubrication Film



The surfaces are completely separated by a load carrying oil film

# COMPOSITION OF GREASE

## Two (2) Main Components of a Grease:

- ♦ Base Oil
- ♦ Soap/Thickener

## How does Composition effect “Pumpability”?

- ♦ Dropping Point
  - ♦ Pour point
- ♦ Temperature of Environment
- ♦ All are NLGI #1’s compatible?



THICKENERS &  
ADDITIVES

15%

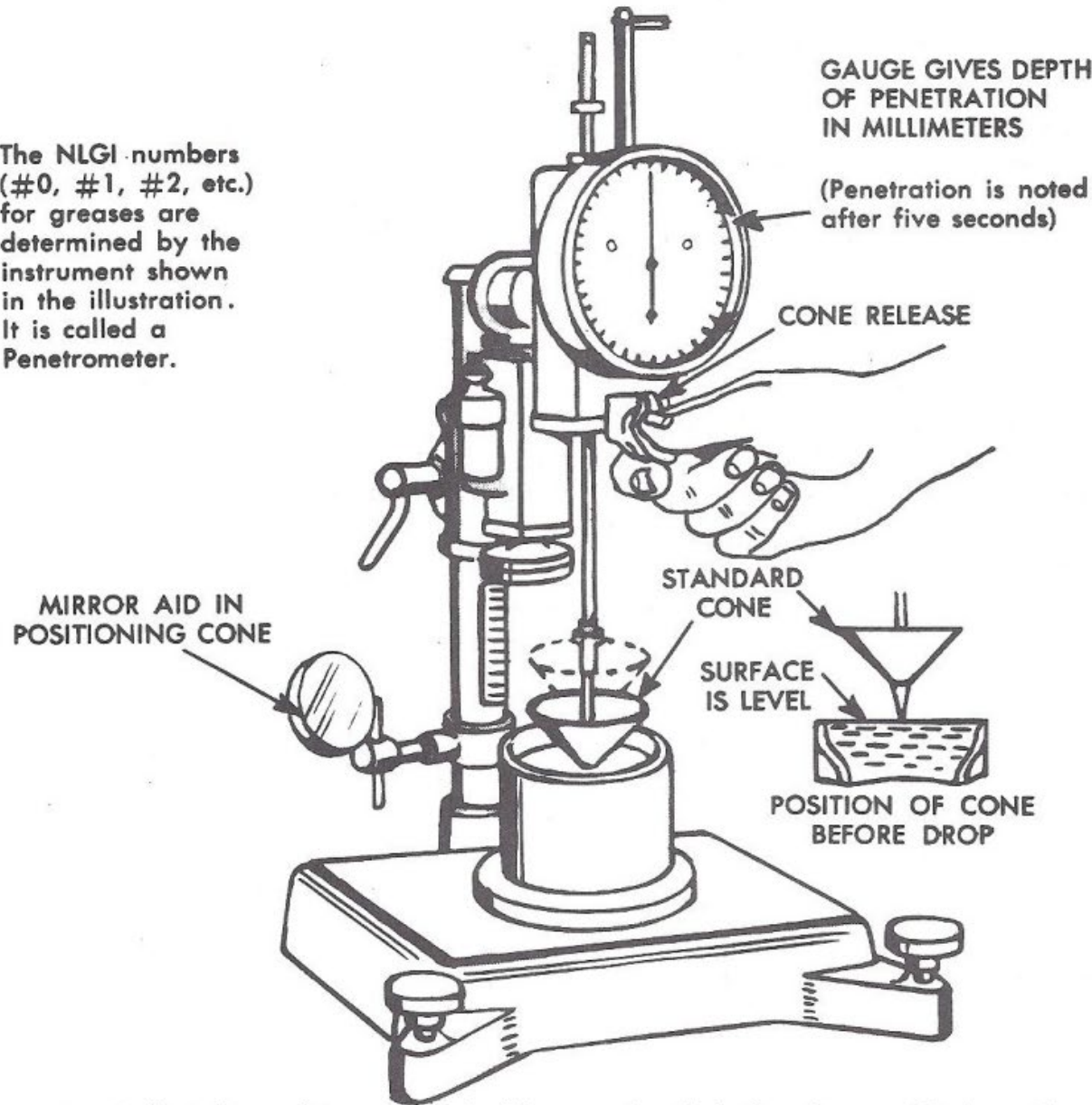
BASE OIL

85%

# COMPOSITION OF GREASE

## THE NLGI NUMBER SYSTEM FOR GREASES

The National Lubricating Grease Institute has developed a system for numbering greases, based on a test that can be readily and quickly performed. The test method is illustrated. The chart converts the test results into the NLGI number of the grease.



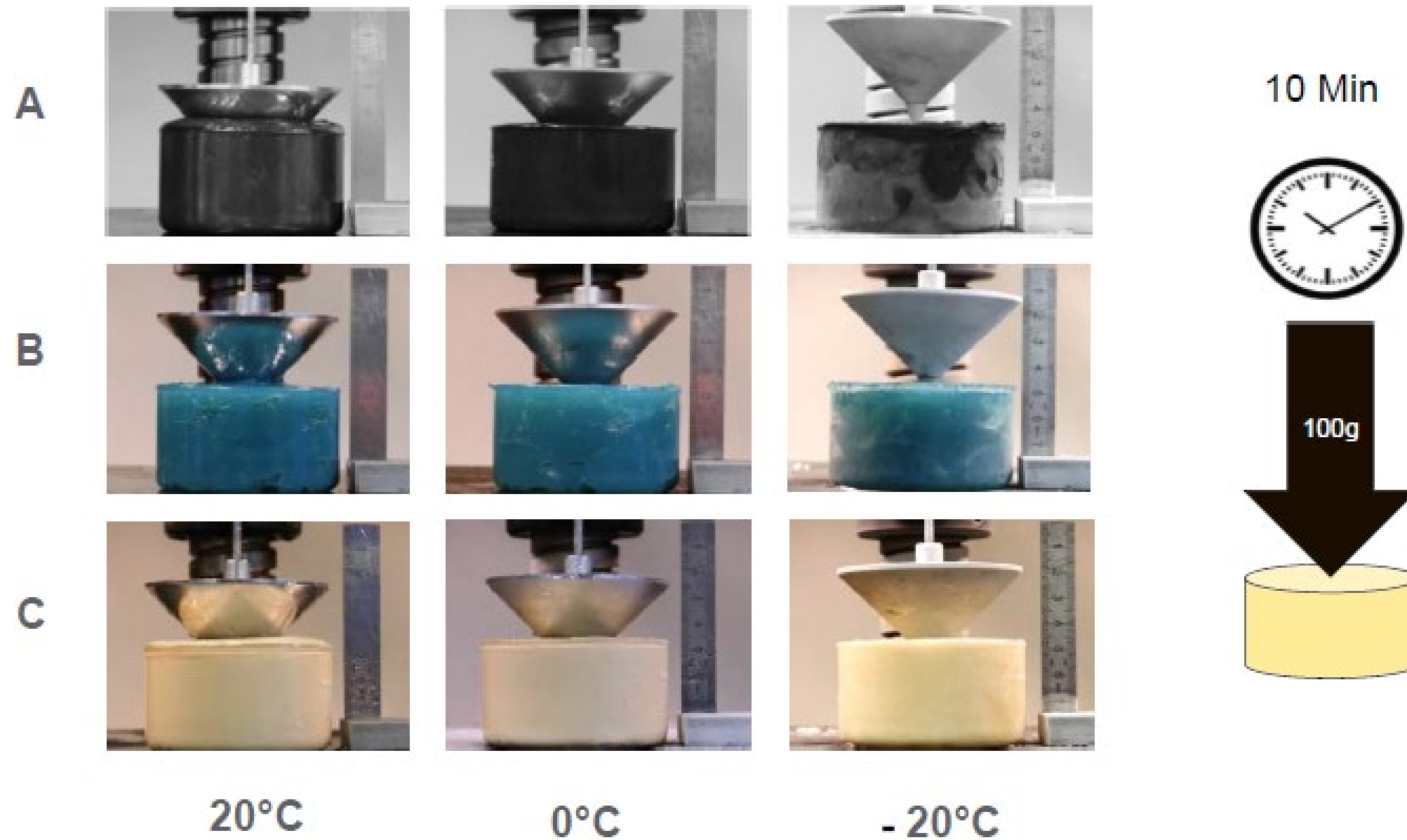
The NLGI numbers (#0, #1, #2, etc.) for greases are determined by the instrument shown in the illustration. It is called a Penetrometer.

NLGI — NUMBER OF GREASE	DEPTH OF PENETRATION (Tenths of a millimeter)
000	445 — 475
00	400 — 430
0	355 — 385
1	310 — 340
2	265 — 295
3	220 — 250
4	175 — 205
5	130 — 160
6	85 — 115

Once the depth of penetration is known, it can be converted into NLGI numbers by the chart opposite.

The grease is first churned in a colander-like vessel called the Grease Worker. The worked grease is then packed into the Penetrometer cup and smoothed off level. Next, the cone-shaped weight is allowed to sink into the grease for 5 seconds while the depth to which it sinks is indicated on the dial in tenths of a millimeter (25.4 millimeters = 1 inch). All this is done at a test temperature of 77°F.

# Consistency shift by temperature



- 3 greases NLGI #2
- 3 Temperatures, 9 Consistencies
- Softest becomes the hardest

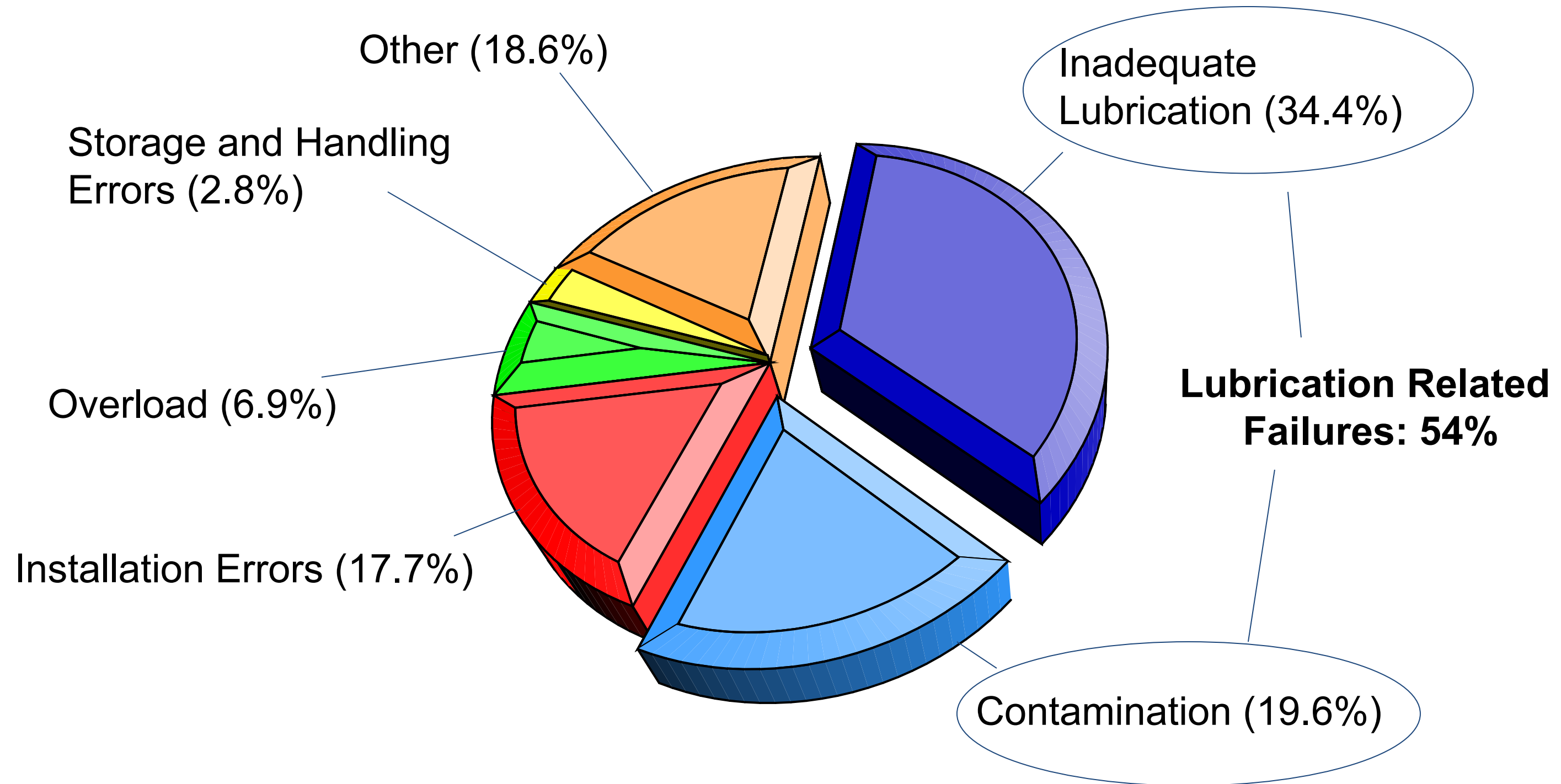


# Bearing Lubrication/Analysis

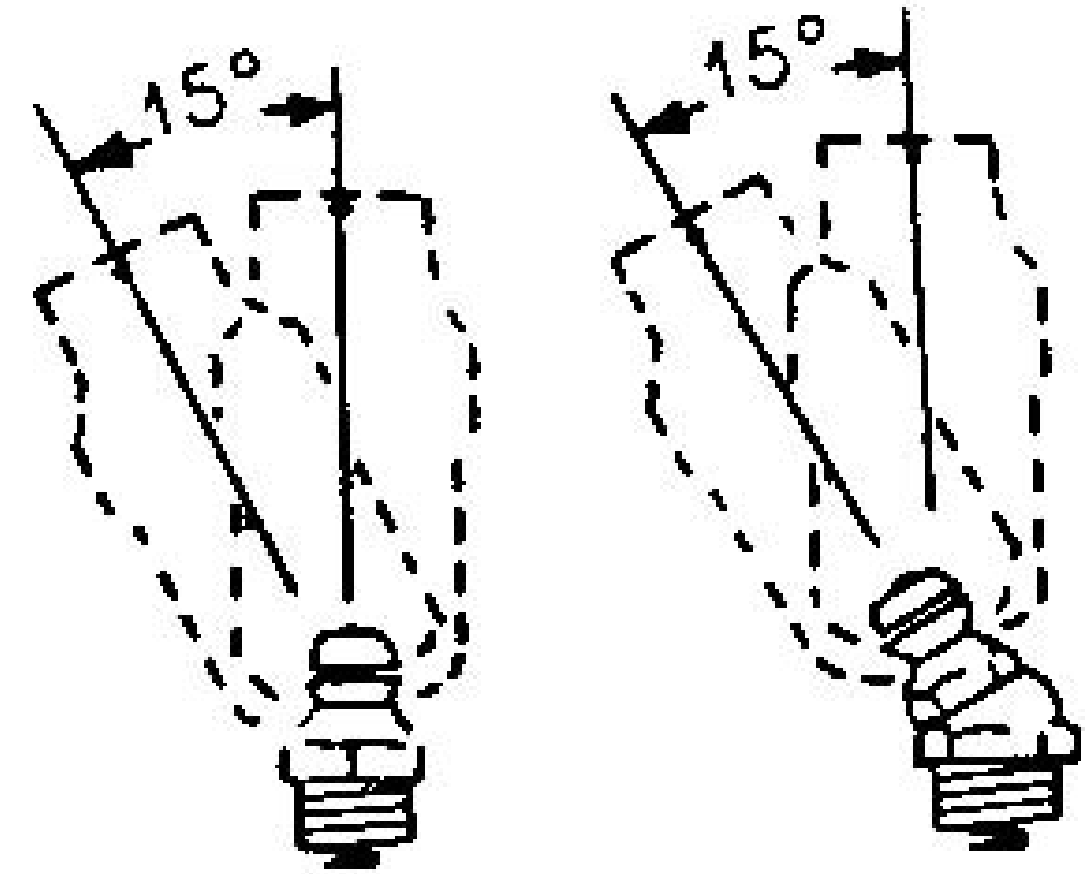
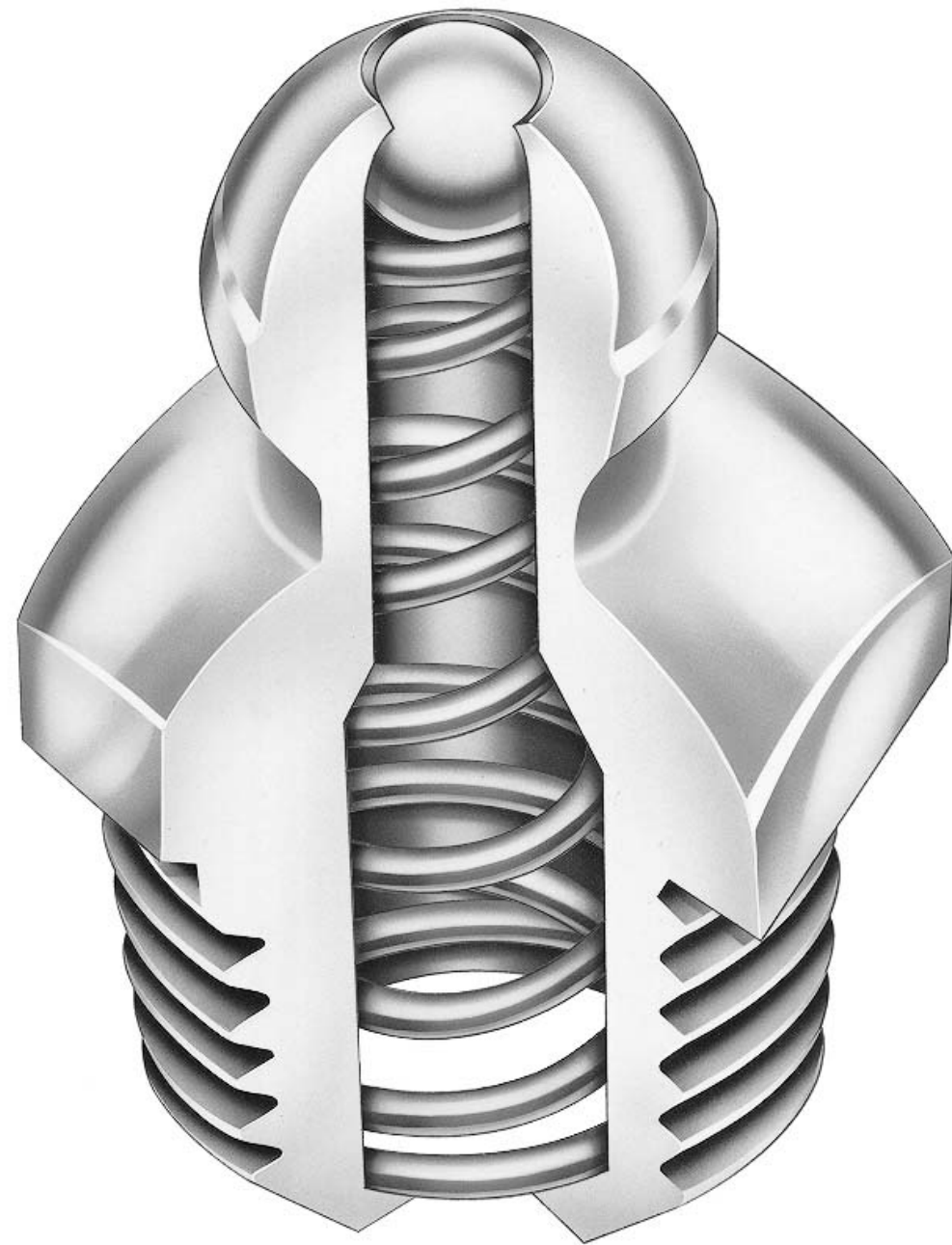
- Manual lubrication is still the predominant method of lubrication for grease lubricated bearings.
- Over 95% of all bearings are manually lubed.
- In a typical plant maintenance budgets have been declining with the result that there are fewer person carrying out lubrication requirements and analysis.
- Plant production has increased allowing less scheduled time for lubrication/maintenance.
- Longer intervals between servicing are required from the mobile equipment

# Why Pins and Bushings Fail...

In a study conducted by a major component manufacturer, over 50% of failures are the result of improper lubrication.



# Grease Fitting

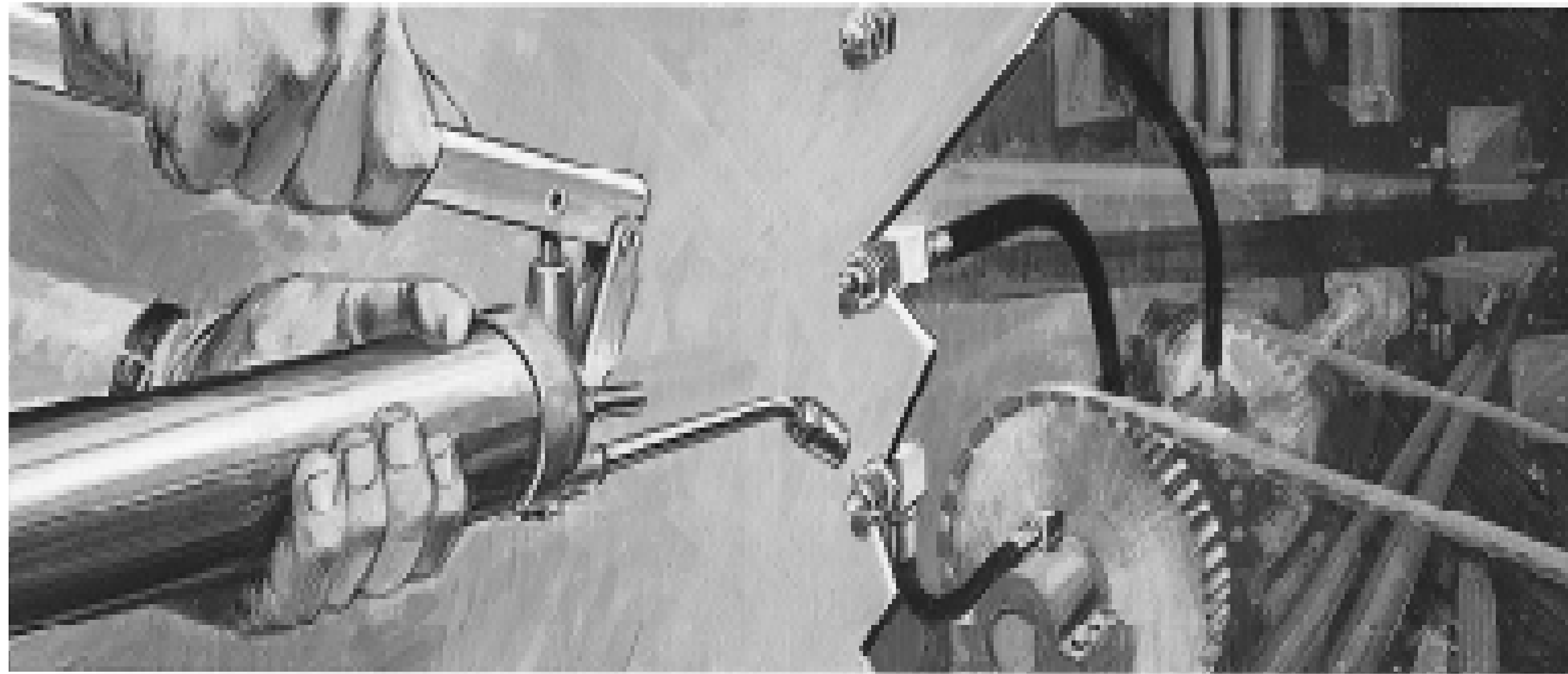


attached coupler to fitting at an angle



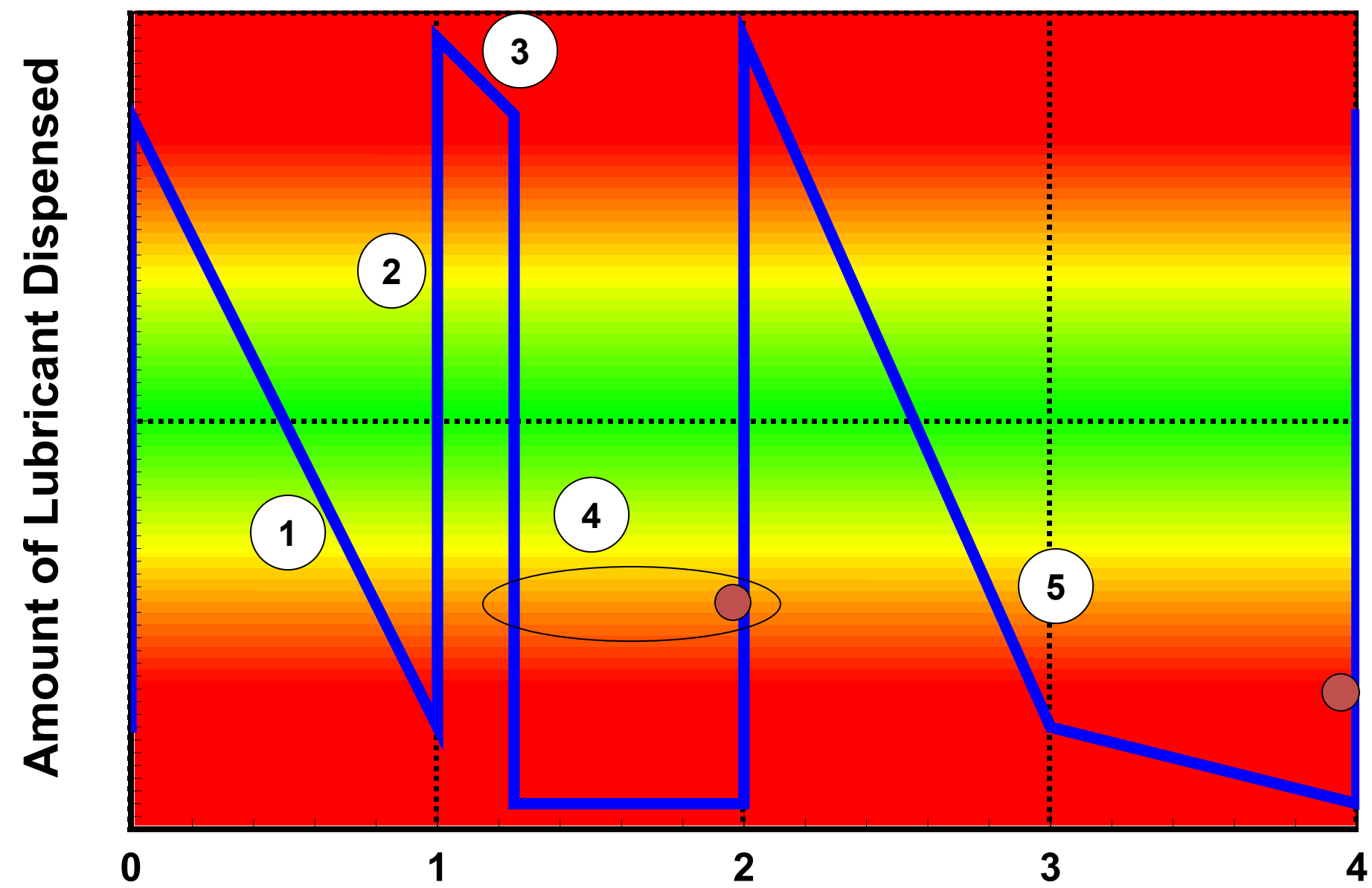


# Remote Lines





# Manual Lubrication Cycles



Optimum Lubrication Amount

Over/Under Lubrication

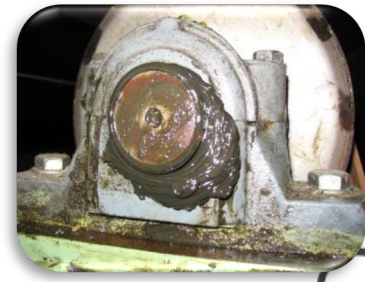
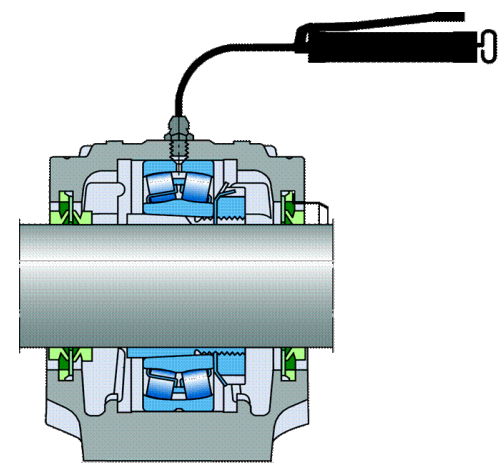
Extreme Over/Under Lubrication

Lubrication Event

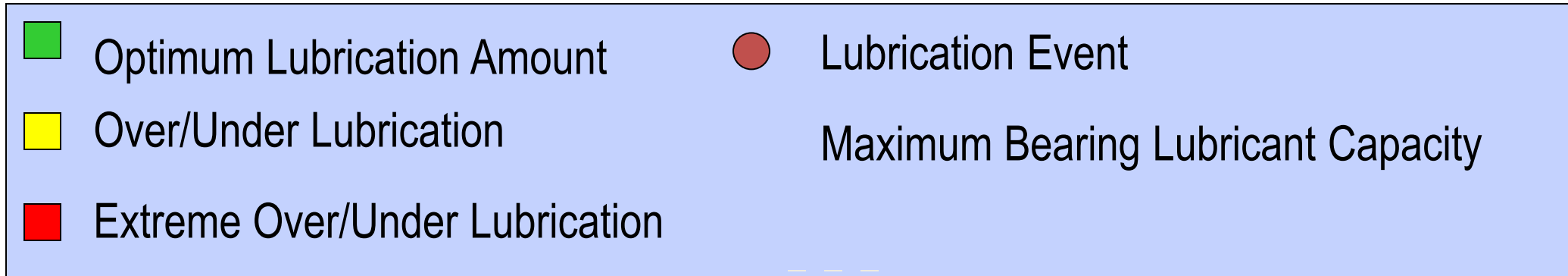
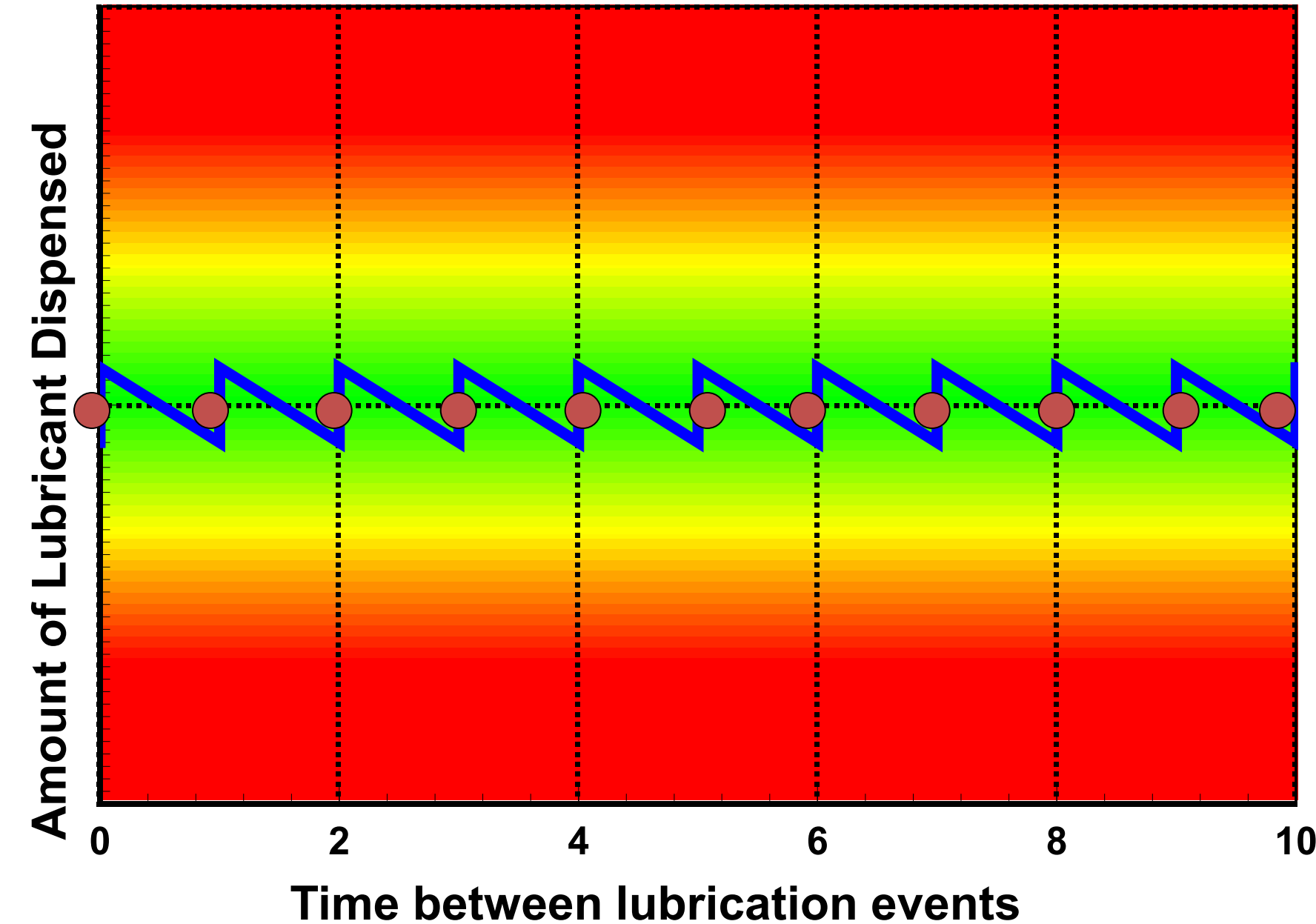
Maximum Bearing Lubricant Capacity

## Disadvantages

- 1. Contamination
- 2. Breached Seal
- 3. Washdown Cycle
- 4. Bearing Starved of Lubricant
- 5. Missed Lube Event



# Automated Lubrication Cycles



## Advantages

- ◆ Small measured amounts of lubricant
- ◆ Proper amount of lubricant maintained
- ◆ Contaminants purged
- ◆ Environmentally safe

# Single Point Automatic Lubricators

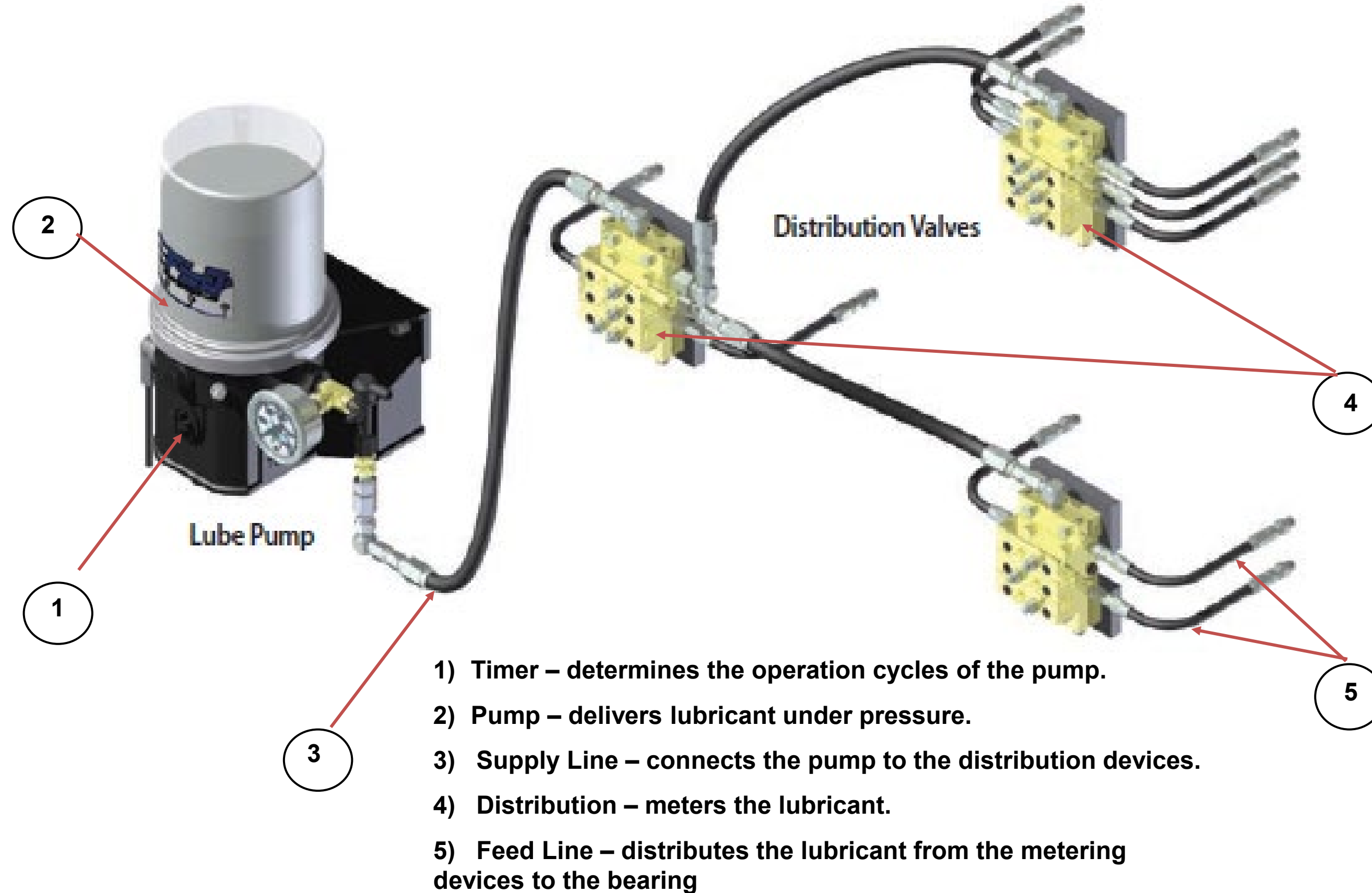


**Always confirm operating capabilities of SPAL within the environment's temperature**

**For all motor bearing applications, always use a 1 # pressure relief fitting in replace of the drain plug. This is to ensure that excess grease does not enter the motor housing due to weak seals inside the motor bearing cavity**



# Five Components of Automatic Lubrication System





# PERSONNEL

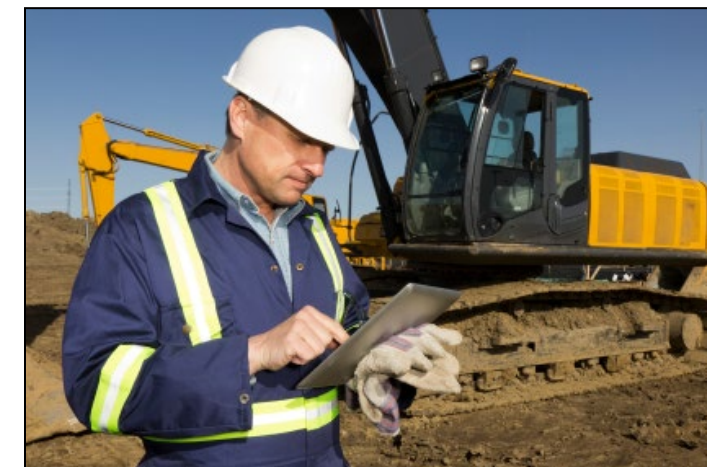
## Who do we train?

- Operators, mechanics, millwrights
- Management / supervisory team
- Purchasing

## Systems and information in place are only useful if we:

- Lubricant Samples/Plant Audits
- Understand
- Believe
- Use them properly

**Get away from “the greaser is who ever is on “light duty – injured” this week.**



# CHALLENGES

Technology will advance more in next 5 years than last 20 years

Harness new technologies in current & future projects – machine telematics

“Push the boundaries” – Plant and Garage use the same type/grade of lubricant

Reduction in Skilled Trades making Training a priority



## Change the saying!

“it’s only temporary unless it works!”

“if it ain’t broke don’t fix it!”

“that’s the way we have always done it!”

***“Adapt to Overcome!”***

***Equipment operation and maintenance is like a three-  
legged milking stool.  
Management, Ownership/Personnel, and Training –  
Lose one of the legs, the Stool collapses.***







THANK YOU