Maintenance & Reliability

Maintenance Results vs. Cost / Effort

- Do you have a strategy to maintain your assets?
- Is your strategy returning the investment?
- Is your strategy primarily PM?
- Do you have failures even after PM?
- Are maintenance costs too high and labor in short supply.
The Waddington Effect

A biologist by trade, Conrad Waddington contributed to the war effort with his unusual insight into aviation maintenance. Is it possible to over-maintain a vehicle?
Nolan and Heap Curves

A form of deterioration model developed by Nolan and Heap in a study conducted in 1978 for the airline industry.

Fig. The six failure patterns identified by Nolan and Heap.
PM Evaluation

- Do not address the asset failure modes.
- Scheduled at incorrect frequency.
- Intrusive.
- Have value but not well defined. Rewrite/Quantify
- Regulatory/Safety/PSM
- Eliminate non-value added
P-F Interval Curve

Proactive Domain
- Installation
- Lubrication
- Operation
- Preventive Maintenance
- CBM

Predictive Domain

- Acoustic Emissions
- Ultrasound
- Changes in Vibration
- Wear Debris in oil
- Heat Detection by Thermography
- Audible noise

Protective Domain
- Heat by touch

Functional Failure
PLUS
Collateral Damage
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Condition Based Monitoring & Acceptable Risk

- Choose a strategy
- Evaluate
- Refine based on cost vs. acceptable risk.

- Vibration
- UE
- Oil Analysis
- Thermography
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What is stopping you

• Greater reliability
• Reduced cost to maintain
• Labor gained from non-value added tasks

What is missing?
Maintenance & Reliability

- Tim Kinnick M & R Specialist Adm Ag Services
- Tim.kinnick@adm.com
- Cell: 316 305-9510