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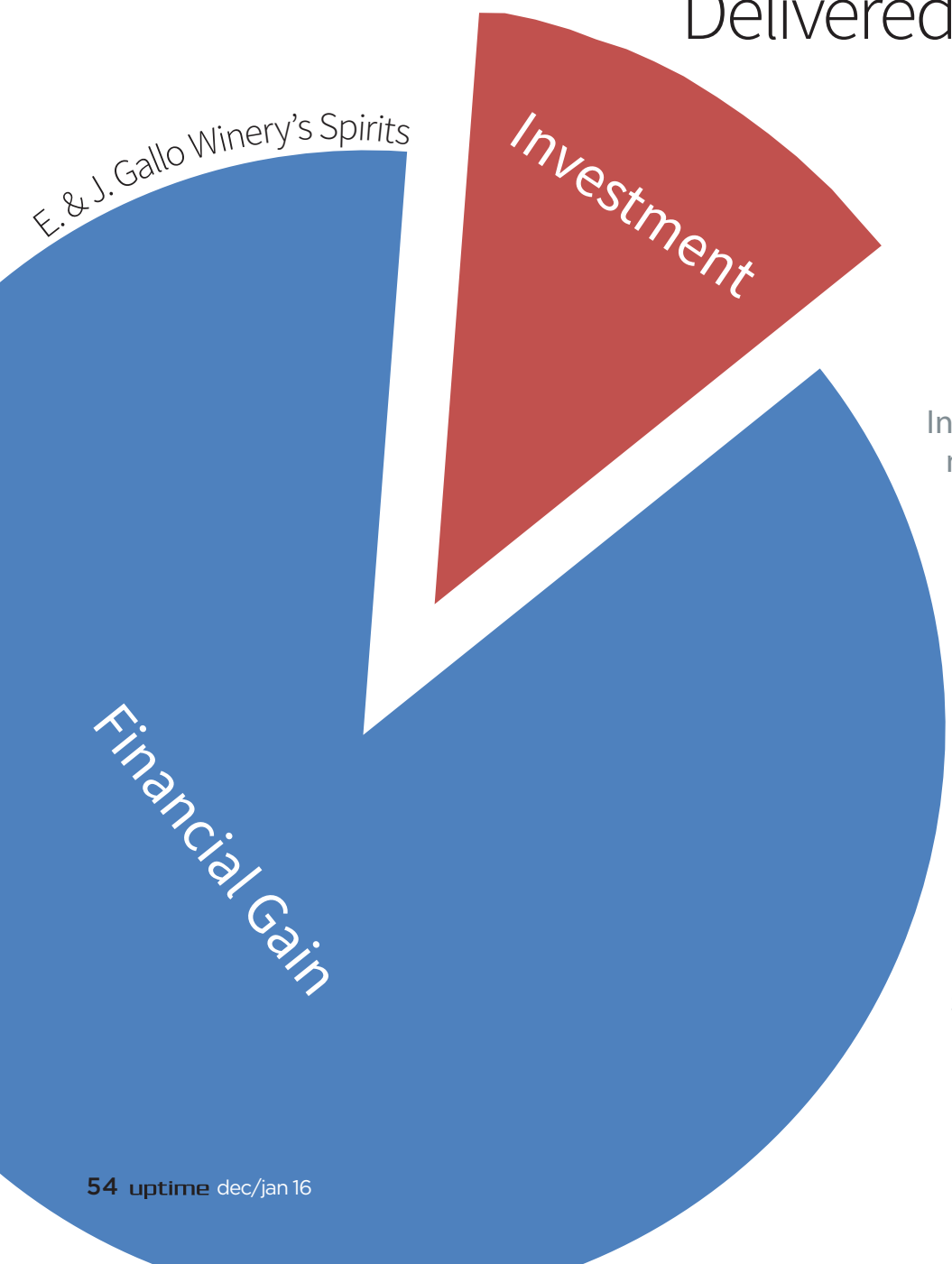
How a New Reliability Maintenance Program Delivered a 705% ROI



by Clay Calk

In 2012, E. & J. Gallo Winery's spirits making plant committed time and resources to transition its current asset management and lubrication program to a world-class reliability maintenance program utilizing professional services and enhanced lubricants. Plant management's key objectives for the new reliability maintenance program were targeted to accomplish three plant goals: improve overall equipment effectiveness (OEE), reduce cost and increase plant profitability. Here's how the successful transition took place.

Key objectives: Improve overall equipment effectiveness, reduce cost and increase plant profitability

Preliminary Information

In the strategic planning phase, six key areas were targeted for review and evaluation prior to the new program's implementation.

1. Understand current costs associated with the existing program, including electrical energy usage, cost of unscheduled downtime, annual lubricant expenditures, prevention of historic major failures, frequency of repairs/rebuilds and labor costs associated with reactive maintenance.
2. Perform a comprehensive detailed asset inspection. List current lubricants used, parts to lubricate, method of application, fill quantities, and service and change interval. Verify whether or not current lubricants meet or exceed operations and maintenance (O&M) specifications for each asset.
3. Inspect each critical asset and identify the appropriate lubricant sampling hardware as part of a new condition-based program. Identify the appropriate contamination control hardware required to protect the asset and lubricant from particulate and moisture ingression so as to maximize each asset's lifecycle.
4. Inspect current lubricant storage and handling conditions and determine if they comply with Gallo's 5S system (**sort/straighten/shine/systemize/sustain**) for workplace organization initiatives.
5. Set up metrics for performing a gap analysis to document before and after program savings to justify the return on investment (ROI).
6. Improve the level of knowledge and education of Gallo's maintenance personnel to aid in changing the culture and drive lubrication and asset reliability methodologies for continuous improvement.

Phase I – Program Evaluation

In 2012, Phase I began with the performance of a comprehensive reliability assessment and equipment and lubrication survey of all lubricated assets to understand the process, current lubricants and current practices in order to establish the program's baseline.

Macro overview of survey's findings:

- Inspected and evaluated approximately 1,820 lubricated components.
- Discovered that:
  - Twelve percent of the application points were being lubricated with the wrong viscosity or wrong type of additive system per O&M specifications.
  - Consolidation opportunities existed to reduce lubricant products at Gallo by 31 percent.
  - Lubrication storage, handling and transfer facility required improvement per 5S initiatives.
  - Filtration, oil analysis monitoring and contamination control required attention.

Plant Area Location	Equipment ID	Description	Make & Model	Part to Lubricate	LE Product	Method	Fill Qty	Service Interval	Change Interval	Analysis Interval	LEAP Test Kit Type	OEM	Current product
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Baldor Electric Motor	Electric Motor		Sealed							
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Dodge Tigear 2 Gear Reducer	Gearbox	9460	Fill	1 Pint	12M	12M			Mobil SHC 634, ISO VG 460, SAE 140W	Lubriplate SFGO Ultra 460, SAE 140W, AGMA 7S, PAO
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Chain	Chains x 2	4059	Spray	Coat	12M				ISO VG 68, SAE 20W	Lubriplate FMO-350-AW-Spray, ISO VG 68, SAE 20W, Mineral
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Column Bearing	Ball Bearings x 3	4025	Grease Gun	1-2 Shots	12M				NLGI #2 EP	Lubriplate Puretac #2, NLGI #2 Non-EP, Aluminum Complex, Mineral
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Chain & Sprocket	Chain & Sprockets x 2	4059	Spray	Coat	12M				ISO VG 68, SAE 20W	Lubriplate FMO-350-AW-Spray, ISO VG 68, SAE 20W, Mineral
Line 21 Bottling	ID: Beer GMBH Belomat Foiler	Beer GMBH Belomat Foiler	Open Gears	Open Gears x 2	4025A	Spray	Coat	12M				ISO VG 68, SAE 20W	Lubriplate FMO-350-AW-Spray, ISO VG 68, SAE 20W, Mineral

Figure 1: Reliability assessment

Figure 2: Before and after lubricant storage room

Figure 3: Before and after lubricant utility carts

Phase II – Program Transformation

Phase II of the program transformation was to focus efforts on the lubrication storage and handling area to eliminate contamination where it originates (new lubricants). Furthermore, the existing lubricant storage and handling facility required improvement to Gallo's 5S initiatives, making this change a priority before moving the initiative downstream. The plan would include adding proper lubricant storage with three-way filtration and desiccant breathers, lubricant product identification and color-coding to mitigate cross contamination and lubricant misapplications on the plant floor. Organization and procedures for sustainability also would be part of the plan.

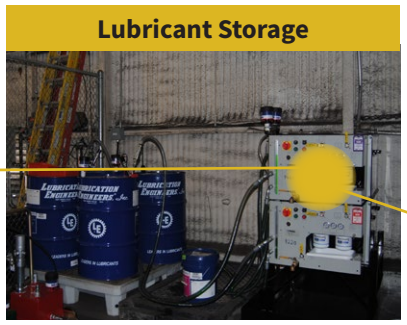
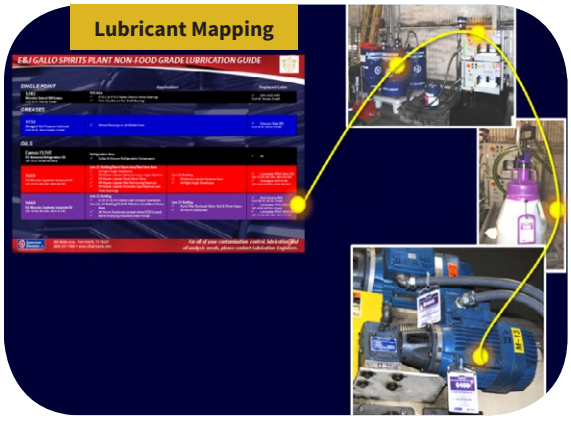


Figure 4: Lubricant color mapping for lubricant storage room

Phase III – Program Transformation

In the next phase of the transformation, Gallo's 5S initiatives that began in the new lubrication storage and handling facility were applied downstream to each asset on the plant floor, with proper lubricant identification and color mapping for both oils and greases.



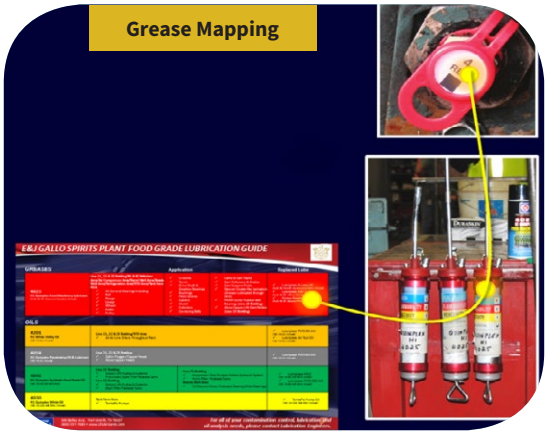


Figure 5: Lubricant color mapping from lube room to application point (oils and greases)

Figure 6 (a-c): Reliability hardware asset modification

Phase IV – Program Transformation

After completing Gallo's 5S initiatives downstream, Phase IV centered on two critical areas that would extend the lifecycle of each critical asset, as well as provide longer oil life, reduce costs, increase overall equipment effectiveness (OEE) and provide tangible and measurable bottom-line returns.

First, moving from a time-based to a condition-based lubrication program, Gallo installed lubricant sampling valves in the primary sampling zone on all critical assets. This provided Gallo technicians the capability to pull accurate, representative lubricant samples on the fly while equipment was running to eliminate unnecessary downtime. Second, the program had to address the contamination control program for all critical equipment. This step was crucial in order to mitigate the most destructive particulates (e.g., dirt and water) that led to frequent oil changes and reduced asset lifecycle.

Protecting these assets from these destructive particulates, coupled with condition monitoring, ensured multiple benefits, including: 1) longer oil and asset life, 2) less oil waste disposal, 3) reduced downtime, 4) less reactive maintenance and 5) improved electrical, asset and overall equipment effectiveness. These benefits yielded measurable cost savings that will continue to pay dividends perpetually.

Phase V – Program Transformation

The number one reason new program transformations are unsuccessful is the culture of the organization. Gallo's strategy to drive this culture change was by increasing the level of knowledge and education of its people. The type of education and training body of knowledge that would be required to support its culture change and new reliability maintenance program initiatives included these six topics: 1) *Introduction to Reliability Centered Maintenance (RCM)*, 2) *Oil Analysis 101*, 3) *Lubrication Fundamentals*, 4) *Contamination Control: Building Asset Reliability and Lubrication Excellence*, 5) *Understanding Friction & Types of Wear Generation* and 6) *Understanding Filtration and Filter Media*. Furthermore, the training materials were the catalyst for select Gallo personnel to obtain machinery lubrication technician (MLT) level I and II, and machinery lubrication analyst (MLA) level I and II professional certifications.

Figure 7: On-site education and training

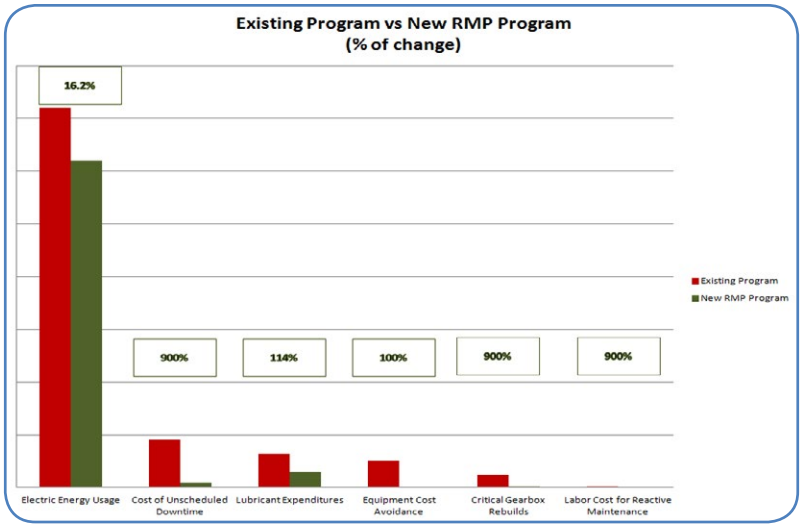


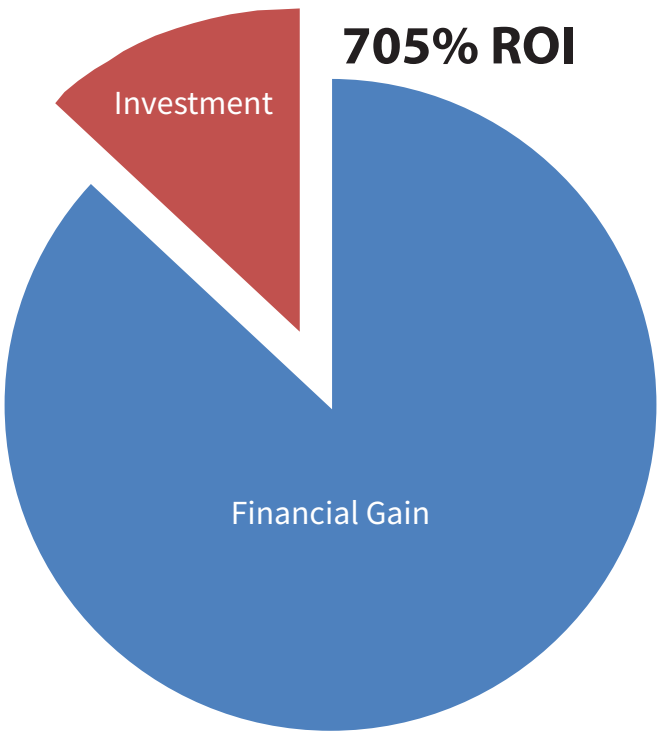
Figure 8: Program savings and variables measured

Phase VI – Program Documentation

The data in Figure 8 demonstrates the existing program and associated costs for years 2011 and 2012 and compares this data to the new reliability maintenance program and associated costs for years 2013 and 2014. Overall plant equipment effectiveness improved by nine percent.

Calculating ROI

In performing the ROI calculations, the amount of financial gain achieved by Gallo was divided by its total program investment. The substantial and perpetual savings yielded a return on investment of 705%.



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Credits: Special thanks to E. & J. Gallo Spirits Plant and Mr. Freddy Delgado for the support and information documented over the past two years to prepare this executive summary.

Clay Calk, *Department Manager – Business Solutions, has worked for Lubrication Engineers, Inc. for 16 years. Mr. Calk oversees all administrative and sales functions in the Inside Sales Department, which encompass order processing, customer service, inside sales, and national strategic accounts. Clay is CLS, MLT II and MLA II certified. www.LElubricants.com*

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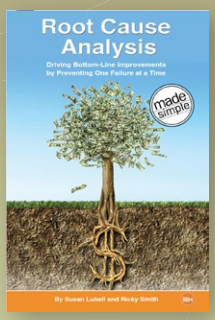

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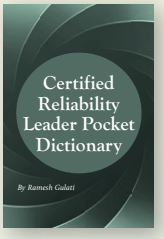

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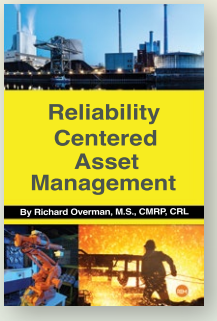

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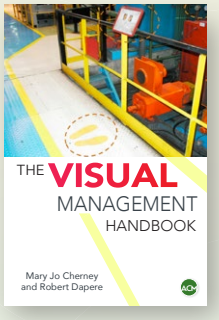

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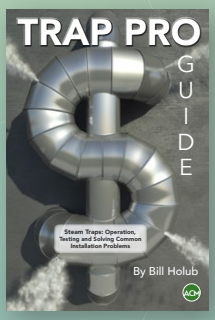

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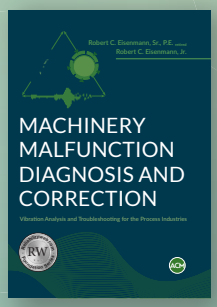

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