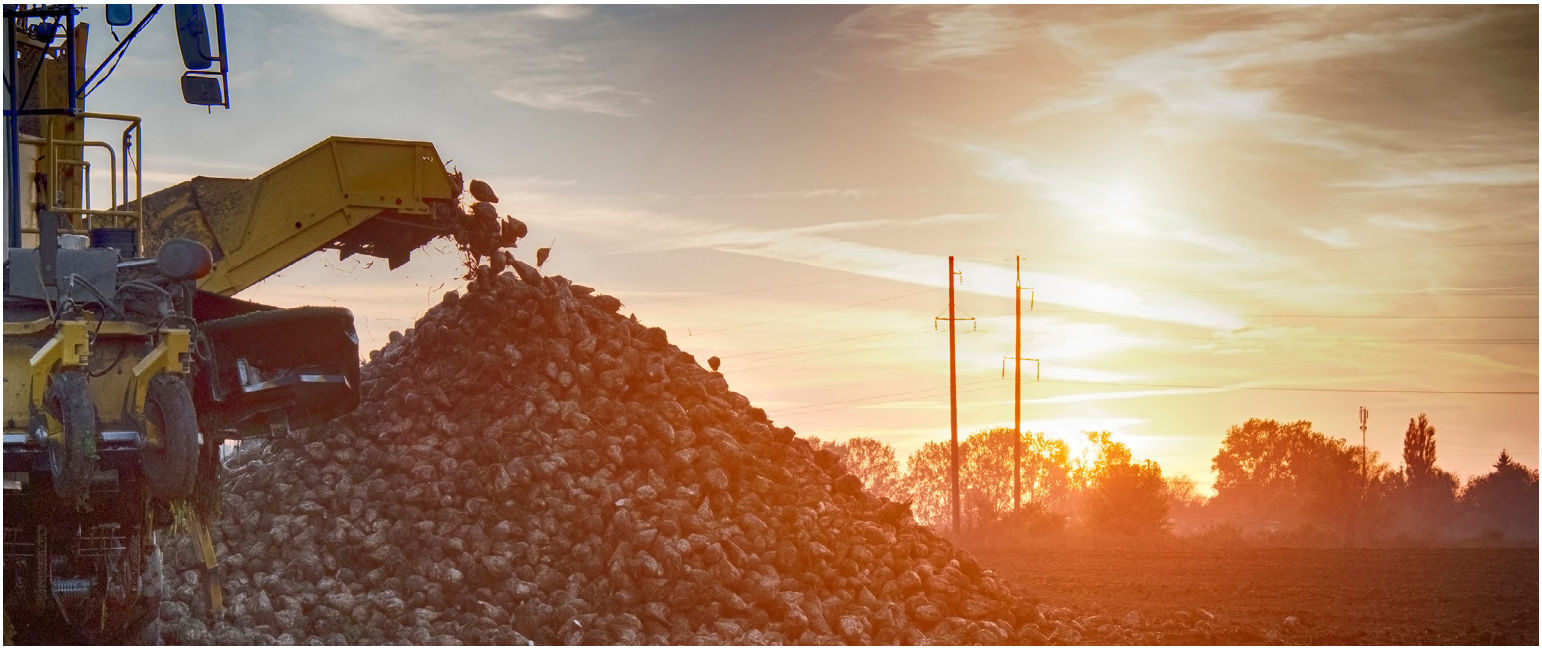

## Industry
Food and Beverage

# LCE Helps a Food Processing Plant Build a Failure Mode-based Preventive and Predictive Maintenance Program to Prevent Failures and Downtime

## Situation
A large-scale food processing plant located in the Midwest was performing proactive preventive maintenance activities including lubrication, and using predictive maintenance technologies such as vibration and oil analysis. However, the preventive maintenance program lacked the justification of risk mitigation controls using specific failure modes to prioritize, prevent or mitigate risks of failures during production.

## The Challenges
The plant operates in a campaign mode based on the harvest season. The plant processes the harvest 7x24 for the duration to process the harvest. Once the harvest is processed, the plant switches to inter-campaign activities including the inspection, rebuilding and repair of major equipment, and preparations for the next harvest campaign season.

The challenge for the plant is to inspect and repair equipment during inter-campaign and maintain the equipment during the campaign season, resulting in the prevention and avoidance of significant failures and downtime.

## The Approach
LCE had previously supported this plant on a Reliability Excellence project focused on defining reliability work processes, and the purchase and start-up of CMMS software. Plant leaders reached out to LCE for help with another challenge: improving their PM program in order to avoid significant downtime during campaign season.

The first step was for the plant to review the criticality ranking of their assets, assigning them numbers from 1 (most critical) to 5. The plant then selected 62 assets that lacked PM plans or were causing repeated downtime events. The selected group consisted of 22 Criticality 1 assets, 32 Criticality 2 assets, and eight Criticality 3 assets.

LCE helped the plant team review the list based on the selection criteria to determine which assets would receive a failure mode and effects analysis (FMEA), followed by an equipment maintenance plan (EMP), and the final PM task list. Not all Criticality 1 and 2 assets received the full analysis of FMEA, EMP, and PM. Some assets required only an EMP and PM development. The final scope was as follows:

- 62 assets were defined as critical and required EMPs and PMs
- 35 assets also required an FMEA

The five-member LCE team included three reliability engineering consultants (one was a working project leader) and two asset management consultants. The reliability engineers developed the FMEAs while the asset management consultants developed EMPs and PM task lists. The LCE team collaborated with plant leaders to develop an overall project work schedule which tracked both LCE and plant personnel work activities and milestones. The schedule included duration time and milestones for each of the 62 assets for the following:

- FMEA development and plant approval
- EMP development and plant approval
- PM development and plant approval
- Upload to CMMS by the plant (100% complete)

As the schedule progressed, it was critical for the team to utilize one-week 'look aheads' to schedule plant resources. At LCE's recommendation, for an asset to be considered 100% complete the PM plans had to be uploaded to the CMMS in an active status.

## Results

The LCE team work collaboratively with key plant personnel to complete this project. The results were a direct result of this collaboration. The FMEA-EMP reviews, discussions and scoring facilitated a multitude of system design modifications, preventative maintenance strategies, predictive maintenance strategies, and critical spares to stock in case of failures. Existing preventive maintenance job plans were also either removed or improved based on the results of the FMEA-EMP review process.

The processing plant's new CMMS now has a failure mode-based preventive and predictive maintenance program. Current and future plant equipment owners will be able to reference asset-specific FMEAs and EMPs to justify and implement proper risk mitigation strategies moving forward. The project was completed on time and 5% under the cost estimate.