



Assetivo

Case Studies

Case Study: Cause & Effect RCA on Freezer Belt Breakages at a Frozen Food Manufacturer.

Executive Summary

Repetitive Spiral Freezer belt breakages had become a significant problem for a frozen food manufacturer. The MTBF was approximately 1.4 months and each stoppage averaged losses of £22,500 and 15 hours downtime. There had been 5 stoppages so far in the previous 7 months. Assetivo was requested to perform a cause and effect RCA with the a cross-functional team from a major frozen food manufacturer. A cause and effect chart was developed that showed the physical, human, and systemic root causes of the belt breakages. The main causes were shown to be high belt tension, poorly fitted belt segments, and a lack of training and quality checking. Solutions included a formal vendor training program, a testing/inspection procedure for belt maintenance, and development and implementation of a training and competency system at the manufacturer.

The Problem Statement

The following problem statement shows the what, when and the where of the problem – including the actual and potential impact for the frozen food manufacturer.

Table 1: The Problem Statement

The Problem	Spiral freezer slow-moving belt breakages	
When	Date	5 instances in the last 7 months
	Time	Various times during shifts
	Unique	Always at top tier / top section of belt
Where	Facility	Frozen Food Manufacturer
	System	Spiral Freezer
	Component	Conveyor belt
Actual Impact	Safety	None so far.
	Environmental	Waste product must be dumped/recycled.
	Revenue	15 hours lost production per stoppage.
	Cost	Mean Time to Repair (MTTR) is 15 hours at a production cost of approx. £1500 per hour. Each stoppage can cost around £22,500 in lost production.
	Frequency	Chronic. The current MTBF 1.4 months.
	Company Reputation	Customer has made one complaint so far due to late delivery.
Potential Impact	Safety	Risk of plastic contamination in product (food safety).
	Cost	Belt failures may cause secondary damage to shafts, and drive motors.

The following illustrations and images show the outline the spiral freezer belt system (main drive not shown), and the belt breakages and splits in-situ.

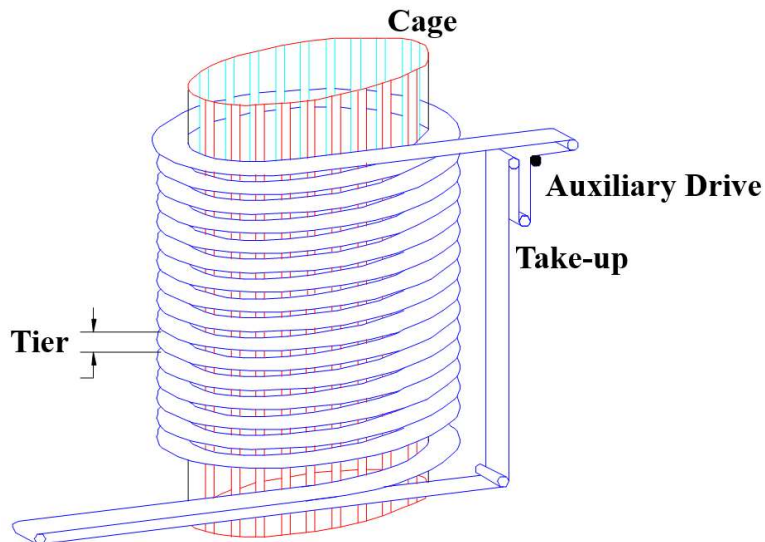


Figure 1: Outline of the spiral freezer belt system



Figure 2: Belt breakage at upper section of cage near cross-supports



Figure 3: Belt breakage near cross-supports



Figure 4: Belt split

Cause & Effect Summary

A cause and effect chart was developed to show the complex inter-relationships of problems – as opposed to a simple 5 why analysis. The chart was developed and facilitated by Assetivo in conjunction with a cross-functional plant team including technicians, operators, safety representatives and the

asset vendors. A pre-chart investigation took place where the team considered the evidence (drawings, failure reports, images, work order, training records, statements, OEM manuals, etc.)

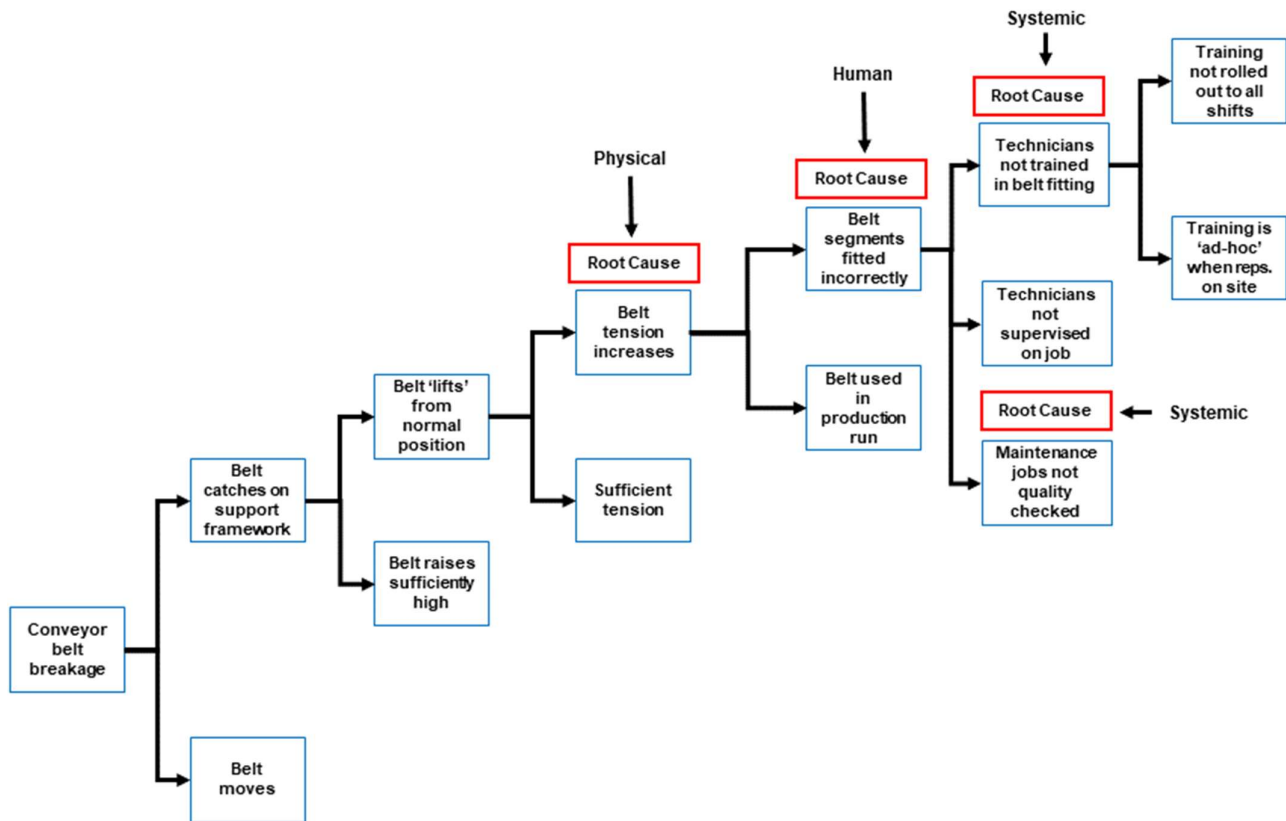


Figure 5: Cause & Effect Chart (simplified) for Spiral Freezer Belt Breakages

The Main Causal Paths & Themes

The cause and effect chart determined several root causes. Firstly, the chart showed that the principal *physical* causes of the multiple belt breakage failures were the increase in belt tension and the belt ‘catching’ on the support framework. Secondly, the *human* root cause was shown to be that in each case of failure, one or more belt segments had been fitted incorrectly by plant technicians. Finally, the *systemic* root causes were shown to be that plant technicians had not received formal training in spiral freezer belt fitting. In conjunction with this, the cause and effect chart showed other *systemic* issues including maintenance jobs that were unsupervised and not quality checked, and a lack of planning for training deployment.

Recommended Solutions

Given that the physical causes of failure were always addressed immediately following a breakdown, it was decided to address the human and systemic causes of belt breakages to prevent future reoccurrences. The following Table 2 matches root causes to solutions with costs, comments, responsibility, and due dates.

Table 2: Causes and Solutions Chart

Cause	Solution	Costs	Comments	Responsible	Completion Date Agreed	Date Completed
Belt segments fitted incorrectly	Vendor formal training program (with competency testing) for all plant technicians on all shifts.	£3 to 5k	To be planned and rolled out ASAP.	AN Other	June 2020	TBC
Maintenance jobs not quality checked	Develop formal testing/inspection procedure for spiral freezer belt repairs – attach to corrective job plans in CMMS.	<£1k	To be planned and rolled out ASAP.	AN Other	June 2020	TBC
Training is ad-hoc when reps are on site.	Develop and implement a formal company training & competency system.	£40-50k	To be planned and rolled out.	AN Other	June 2021	TBC

Conclusion

This basic RCA case study from a food manufacturer has shown the value of the cause & effect method in complex problem solving and the development of lasting solutions. Assetivo can help prevent reoccurrence of your industrial problems and solve downtime issues that impact your bottom line by facilitating cause and effect RCAs.