



## **Business Case Study**

# **Maximize Manufacturing Potential Carpet Manufacturers**

# Business Case Study

## **Project Background**

A business case study was conducted with three carpet fiber extruders. Faced with a maturing and increasingly competitive marketplace, the companies involved in this study are focused on developing strategies to grow their businesses, maintain margins and to provide solid returns for investors.

The companies involved in this study believe that the on line information from the Attalus System can be used to eliminate yarn defects that lead to carpet streaks. At the same time, they want to leverage the production and process information from the Attalus System to boost production efficiency and allow them to respond faster to end use customer demands thus creating a competitive edge.

The traditional method for determining yarn quality involved off line laboratories that sampled a small quantity of yarn. When a bad sample was detected, the lot was recalled and quarantined. Package traceability involved pre-printed labels with information pertaining to the lot, and the machine/positional location where the package was made. Production information involving line breaks, how the machine ran, and shift efficiencies that were at best recorded and calculated by hand.

Of particular concern was traceability within the process. Due to the speed of production, packages placed on pallets were wrapped and stored in the warehouse within hours of production. Even if the laboratory did find something of note, tracking down these packages took a great deal of time. As well, if streaks were produced in carpet production, it becomes extremely difficult, if not impossible to track down the reason for the faulty yarn due to a lack of historical on-line process data.

Attalus emerged as the preferred solution, in large part because the technology and system allows these companies to effectively use never before seen information on the yarn, machine and operator.

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## **Investment in Attalus Product**

The companies in this study installed the Attalus System consisting of the sensors, Programmable Logic Controller (PLC) and computer. As well, these companies also opted to install LED lights at each position to alarm and provide for immediate operator feedback. Label printers were also installed to print out labels at the end of each doff to identify the package with information such as Lot, Machine/Positional location of the package, Time Made, and Package Grade.

## **Analysis at 3 Facilities**

The three facilities in this study adopted the use of the Attalus Fiber System into their day to day operation making use of peripheral devices like the LED's and Package Labelers to react immediately to issues on the line. The analysis was conducted at each facility over a five month period and involved a total of 15 machines with 88 positions. The five month time frame for this analysis was chosen to allow time for alarms to be set and for operators to incorporate the information from the Attalus System into their daily routine. This study noted measurable improvements in at least three aspects of the manufacturing process that resulted in top line (yield) improvements: yarn management, machine and process management, and operator management.

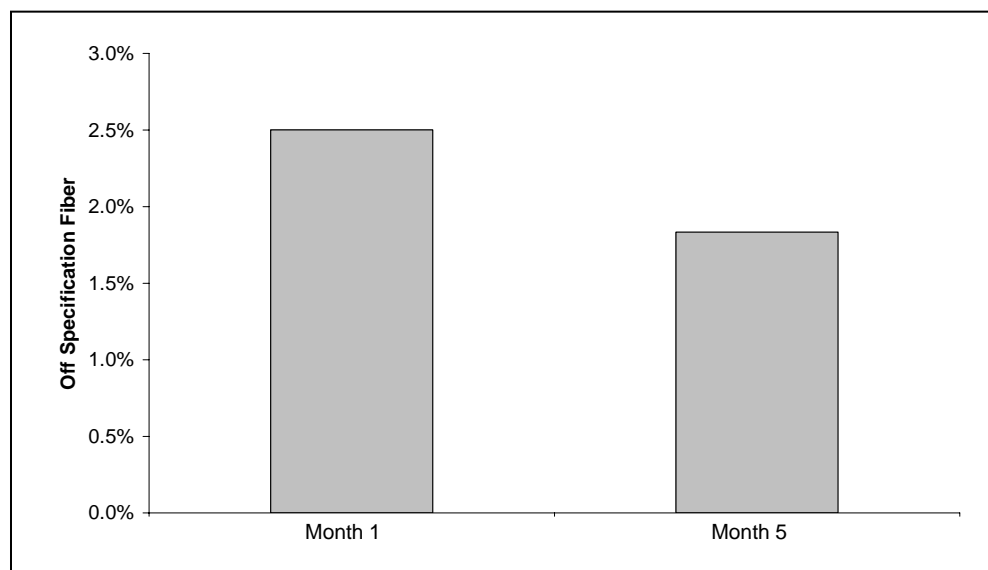
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## Yarn Management – Increase Top Grade Yield

Compared to the status quo, the Attalus System gives managers and operators accurate, real-time product information versus off line laboratory methods. Typically, off specification fiber would continue to be produced until a fault was detected in the laboratory. Staff would then track these packages down and guess at when the problem began. The ability to react in real time increased yield by reducing the time that was spent on producing off specification fiber as well as the production of replacement fiber.

Once the Attalus System was installed in each of the three facilities and the alarms were turned on, the off specification yield in month 1 was compared to the off specification yield in month 5. Although it is believed that the off specification lots would have caused streaks downstream in the carpet, these lots were not released for tufting. As a result, this analysis only focused on the increase in top grade yield as data on potential savings from downstream carpet streaks were not available. The analysis shows that off specification fiber decreased from a median of 2.5% in month 1, to 1.4% after five months of use as illustrated in Figure 1.

**Figure 1: Reduction in Off Specification Fiber**

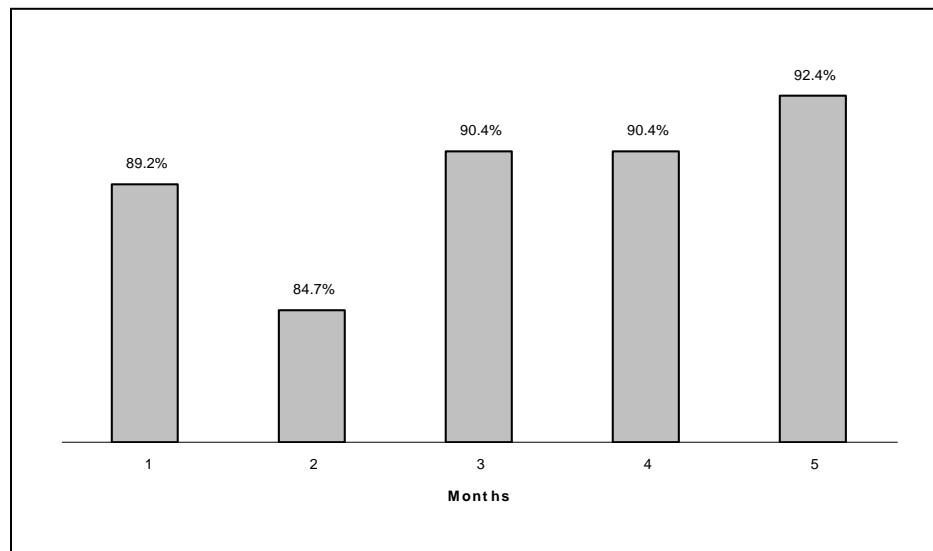


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## Machine and Process Management – Maximizing Machine Uptime

A key improvement across facilities was in machine uptime. The information from the Attalus System provides operators with process information allowing them to diagnose and fix the root causes of out of specification product. This in turn resulted in more uniform processing conditions with less line breaks, downtime, and more importantly product being aspirated to waste. In the first month of the installation, the Attalus System baselined the machine process. In the second month, alarms were established and set to catch non-uniform situations. As shown in Figure 2, the dip in uptime in the second month is attributed to the introduction and the refinement of these alarms. Overall, the machine uptime increased from a median of 89.2% to 92.4%, an improvement of 3.2%, over the 5 month period.

**Figure 2: Machine Uptime Improvements**

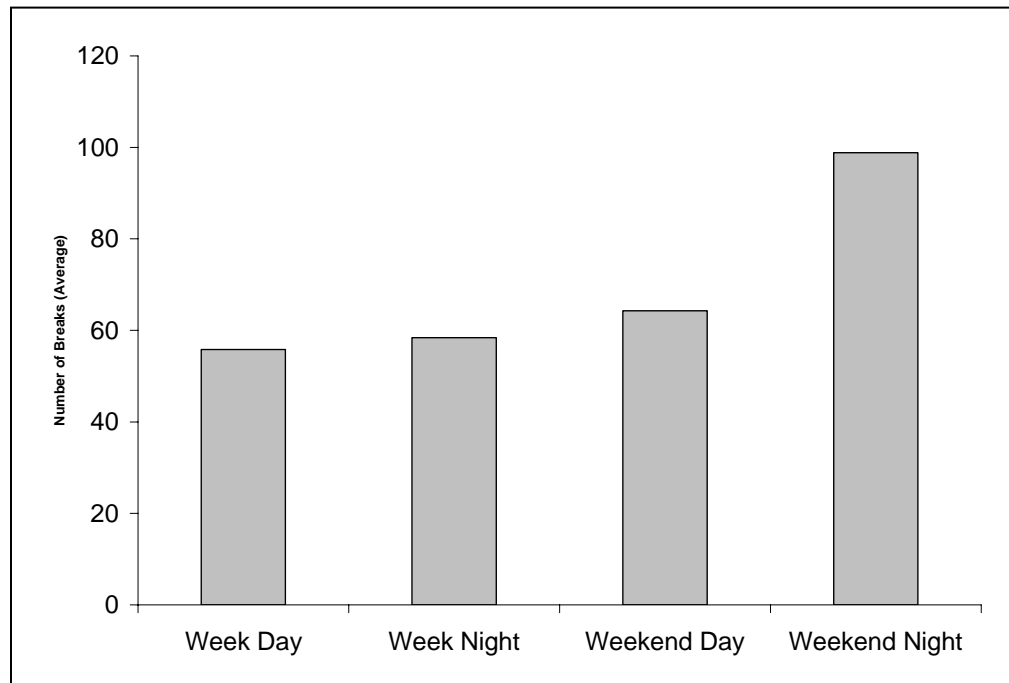


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## Operator Management – Enhanced Operator Performance

On line information from the Attalus System helped management track operator performance. By being able to see events like shift leaders adjusting line tension at the change of every shift, managers can discuss issues with operators that affect machine and product performance. Information from the Attalus System also provides managers with the ability to benchmark operator performance. As an example, Figure 3 below illustrates the use of the Attalus data in comparing the average number of line breaks taken over a six month period at one of the three facilities. The data clearly shows that substantially more line breaks occur on the weekend night shift. This information allows management to act in rectifying situations similar to this that impacts machine downtime and yield.

**Figure 3: Line Break Benchmarking**



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## Benefits Summary

The benefits calculation came from a combination of three sources:

- Top line revenue growth through increased machine uptime
- A reduction in the financial impact of waste (aspirated) fiber due to a reduction in downtime
- Decreased production of off specification fiber

It can be assumed that increased operator efficiencies can increase production yield. However, potential yield improvements from operator management were not taken into consideration as hard data of improvements were not available during the time of the study. Table 1 below summarizes the numbers used in the calculations.

**Table 1**  
**Values Used For Benefits Calculation**

<b>Operational Data<sup>1</sup></b>	
Dtex	2,000
Winder Speed (m/min)	2,500
lbs/threadline/year at 100% uptime	578,160
lbs/threadline/year at 89% uptime	515,950
<b>Yield</b>	
1% Yield (lbs)	5,160
<b>Yield Improvements<sup>2</sup></b>	
Uptime	3.1%
Oddlots	1.5%

The analysis shows that on a per threadline basis, the additional lbs from Yield Improvements based on Oddlots was 7,791. The additional lbs from Yield Improvements based on Uptime was 15,994. Since fiber was aspirated during machine downtime, there is another 3.1%, or another 15,994 lbs of benefit in unaspirated (scrap) fiber.