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# **\$940,000 Annual Labor Savings, And Yield Increased By 10 Million Linear Yards!**

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## **Disposable Medical Products Manufacturer Dramatically Reduces The Cost And Improves Output Of Primary Product**

**\$1,055,000 Investment Results In \$942,500 Annual Labor Savings**

*by Tom Ingram, PMP*

Imagine that you are the general manager for a manufacturing plant that produces a common medical supply such as facemasks. You have built your business as an innovator, but the business has grown and is now facing intense price pressure from both competition and Managed Care.

You have an enormous investment in 52 machines to produce these facemasks and a wholesale upgrade of your production equipment is not economically feasible. You've done everything you can to reduce costs and streamline operations, including moving some activities in-house – but your hoped-for cost savings and throughput improvement has not happened. You even investigated outsourcing, but the costs were too high.

What would you do? How would you approach this problem? Following is a case study of how Mask Manufacturing (not the company's real name) and Web Converting

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collaborated to solve some problems and produce an excellent outcome. Bob Williams (not his real name), Operations Manager for Mask Mfg., also provides some insights from his experience overseeing this effort.

Results from this joint effort produced nearly \$1 million of annual labor savings, reduced waste by 1% and increased yield by 10 million linear yards of material. This was all accomplished with a customer investment of approximately \$1 million, less than 1/20th of the cost to convert the entire production line to new equipment.

This case study provides a summary of how the collaborative effort took place and how the problems were solved. Our hope is that this case study may prove useful to you in the event you face a similar situation someday.



**Background:** A little explanation of terms is helpful for those not familiar with this type of manufacturing. A surgical facemask is composed of several types of fabric, which are processed and assembled into a final product. When purchased, the raw fabric is in very large rolls, ranging from 24-inches wide to several feet wide. A “slitting” operation takes these large rolls of material and cuts or “slits” them down to widths ranging from ½ inch to several inches. Slitting Operations will perform the slitting service and ship the narrow width material in what are known as “pancake” rolls. These pancake rolls might be 12 to 24 inches in diameter, but the material might be only ½ inch thick – looking very much like a pancake. (See picture.) Mask Mfg. had chosen to do its needed slitting in-house as a cost savings and service improvement initiative (rather than use an external slitting service.)



Web Converting provides slitting services and a number of other value-added services, one of which is called “spooling”. This uses a special winding process to place, for example, ½ inch material on a high capacity spool instead of the relatively low capacity pancake roll. A spool can often hold ten times the capacity of a pancake roll, which greatly reduces splicing, roll changes and production downtime. The advantage of spooled material over pancake rolled material directly contributed to the outstanding results from this project.

**Problem:** Mask Mfg. had a bottleneck in its production of facemasks. The production line was using pancake rolls to feed strips of fabric into the mask making machines. Throughput on the manufacturing line was limited because the pancake roll had to be changed every 10 to 12 minutes. Mask Mfg. had developed some machines to splice the pancake rolls, but this splicing operation didn't work quite right.

Splicing of the narrow raw materials was a significant part of the problem. The splicing difficulties were caused by, (1) operators failing to load backup rolls, (2) tape splice being misapplied, resulting in no splice actually taking place and (3) splices breaking in the production machine.

The management of Mask Mfg. was under pressure to reduce the cost of manufacturing through labor and material savings. Management also hoped to improve the production speed of facemasks, increase productivity as measured by number of cartons produced per person, improve packaging throughput and improve quality. Williams mentions that “Splicing is a significant quality issue. It affects both our costs and the quality of the finished product.

**Total Solution Implemented For 5% Of Cost Of Replacing Existing Production Line**

**Solution:** Some of Mask’s management had experience with Web Converting’s personnel, and thought it likely that Web Converting could help. Together, Mask Mfg. and Web Converting conducted a solid cost analysis including labor, benefits, overhead, machine depreciation, space allocation etc. (See Cost / Benefit Analysis below. Williams notes that this is not the original analysis, but generally reflects the thinking and results.)

After studying the problem, Web Converting and Mask Mfg. jointly developed an overall solution to Mask’s production problem, based on the following:

- a. Proof of Concept Demonstration: To help Mask Mfg. reduce the risk of making such significant change, Web Converting brought demonstration equipment to Mask's premises to prove the viability of it's proposal.
- b. Spools instead of Pancakes: The spool approach to handling slitted material would replace the existing pancake roll approach. This would result in spools being changed once every two hours instead of changing a pancake roll every 12 minutes. This also reduced splicing problems and downtime dramatically.
- c. Unwind Machinery: Since Mask's existing machinery was designed to use the narrow pancake rolls, some engineering was needed. Mask Mfg., with Web Converting's assistance, designed the equipment necessary to allow spools to feed into the narrow slot on Mask's existing machinery. Web Converting provided the spools to Mask's specifications (width and diameter), and found a firm to build the custom unwind equipment.
- d. Standard Mask Mfg. Components: The ultimate solution was built to use standard Mask Mfg. components wherever possible. This helped Mask Mfg. keep capital costs to a minimum by reducing the amount and type of equipment that had to be purchased.
- e. Providing Spooled Material: Web Converting provided the slitting operation and spooling service.
- f. Dallas As Critical Distribution Point: Web Converting's plant location in Dallas aided Mask Mfg. efforts to minimize shipping costs and minimize the risk to raw material supplies.

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**Bob Williams, Operations Manager**

**Results:** The accompanying Cost / Benefit chart shows the excellent financial returns generated by this project. Following are some additional results that were achieved:

- **Splicing time was reduced by a factor of 20.**
- **Production downtime caused by splicing difficulties was reduced** and splicing problems in total were substantially reduced. Web Converting was able to show Mask Mfg. that this was a case where hand splicing was actually more effective than automated splicing.
- **Helping Mask understand flaws in its ordering process:** Web Converting was able to help in other ways. In one case, Mask had ordered too much material when cutting over between computer systems. Web Converting brought the double order to Mask's attention, which both saved costs and kept vital raw materials available to meet the production schedule.

**Additional tips for those facing similar situations:** Williams suggests “Try to tie in the supply chain process earlier. Initially, the supply chain did not produce the most cost-effective raw material width. Once we felt comfortable that Web Converting would deliver the product to meet our specifications, we started looking at outsourcing the supply chain to them.

When we outsourced the supply chain to Web Converting, this problem was largely resolved. (See Web Converting Case Study “Supply Process Reduced from 21 Major Steps to 6 Major Steps”).”

Williams goes on to discuss some of the Quality issues in the project. “Web Converting is supplying materials for a Class 1 medical device governed by FDA and ISO standards. This shows Web Converting's ability to consistently deliver materials of needed quality. This is a big deal for us because we have to certify to auditors that our supply chain meets FDA and ISO standards.”



**Summary:** This was a case where partnering produced a dramatic result. Mask Mfg's knowledge of its operations and its engineering staff were a large part of the solution. Web Converting supplied a new technology (spooling) and, because of its expertise in all aspects of slitting, was able to

pull together a series of products, services and suppliers that made the project doable. Web Converting also helped Mask Mfg. approach the project in a low risk manner. Hopefully the lessons above will be of use to you if you should ever face the types of problems faced by Mask Mfg.

### Cost / Benefit Analysis

**Costs:**

- Engineering cost to design custom spooling stands	\$330,000
- 150 spooling stands to support 52 individual machines making facemasks	\$525,000
- Installation of the custom spooling stands	<u>\$200,000</u>
<b>Total Costs</b>	<b>\$1,055,000</b>

**Savings:**

- 27 operators were eliminated from the machine lines (reduced from two operators per machine to one operator per machine.) 27 x \$32,500/yr =	\$877,500
- 2 slitter operators eliminated from the slitting department. 2 x \$32,500/yr =	<u>\$ 65,000</u>
<b>Total Labor Savings</b>	<b>\$942,500/yr</b>

- Waste reduced by 1 percent
- Yield increased by 10,000,000 linear yards! (approx. 1% of total)
- Production Line Uptime improved by 3%
- Number of "good" masks shipped increased from 94.5 per 100 to 96.2 per 100 (Several factors contributed to this improvement – not just spooling improvements.)

For more information,  
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**About this Case Study...**

The research for this paper has included multiple interviews and sources of data to help provide a balanced picture and confirm key assertions. It is written as a teaching and communication tool and is not intended to fully describe exact details or dialog. Contact Tom Ingram & Associates, Inc. if you have questions about this case. This paper has been prepared for a fee. **You are free to duplicate and redistribute this paper**, provided you distribute it as a whole, with credit to Tom Ingram & Associates, Inc.

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Since 1983, Tom Ingram and his project teams have delivered over \$15 million in project contracts substantially on time, on budget and as promised. These projects have generated some **\$55 million in measured benefits for clients**. Ingram has published two dozen articles and newsletters. His book, *How to Turn Computer Problems into Competitive Advantage*, was published by the Project Management Institute in 1998. This case study is part of Ingram's ongoing efforts to recognize, promote and teach about *High Impact Projects*.