# Capital Waste Reduction in Manufacturing

Cutting Costs Through Cable Cutting

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## Executive Summary

Competing in today's manufacturing environment requires new and creative thinking to save money. Operational complexities hide preventable costs that tie up cash in unprofitable segments of the business. Revealing these hiding spots and making improvements can generate real savings.

One contributor to waste is spare electrical automation cabling for machine maintenance. Automation equipment requires unique and expensive types such as industrial-grade robot and heavy-duty power cables. Manufacturers are forced to buy much more cable than they need. Unused cable is eventually discarded thereby wasting both material and cash.

The solution is for a manufacturer to only order what they need. While simple on the surface, it is difficult to predict how much cable will be needed. If a machine shuts down because of a broken cable, then it is critical to have spares on hand. However, a manufacturer still does not need to buy more than what will keep them running. Therefore, it is important to work with a supplier that can provide cables in either specific lengths or smaller spools to reduce waste.

MISUMI offers both. As a supplier of automation equipment, we provide smaller spools of cable and perform custom cuts to eliminate waste. Utilizing these services can help a manufacturer reduce overall maintenance material investment by up to 60%.

## Purpose

Every company that has automation machinery uses electrical cabling. This includes power, data, and robotic cables. Each of these applications can require a variety of material specifications, which increases the total part numbers on a bill of material. Maintaining replacement stock of every cable becomes very expensive.

This white paper highlights the investment necessary to stock replacement cable, analyzes the extra costs involved, and offers a solution to reduce this overall spend.

## A Growing Problem for Manufacturers

Automation machinery is one of the costliest investments in manufacturing. The return on this investment is based on the continuous output of sellable products coming from the machine. Profits are reduced each time the machine stops so these instances are kept to a minimum through scheduled shutdowns for maintenance.

If a machine stops unexpectedly due to broken components, the maintenance team must get it up and running again. Companies spend considerable money to stock replacement parts in their factory. This will ensure the machine is quickly put back into operation but there is no guarantee that these replacement parts will ever be used or have any value at the end of the machine's life.

Unused components are discarded. While investment is necessary to prevent unnecessary downtime, some of this capital could be used in another area that produces a profit. These replacement parts are critical to have on-site, but leaders need to determine how to minimize spend while ensuring machine uptime.

Replacement electrical cabling usage is very difficult to forecast. If a bearing wears out on a conveyor, it is a one-to-one replacement. However, if cable wears out it is unclear how much is needed. It is necessary to keep extra cable on hand but determining how much becomes challenging.

## Examining A Common Maintenance Crib

When analyzing maintenance expenditures, it is easy to look at a purchase order and understand how much money was spent. It is difficult to calculate the unseen costs associated with these purchases. Stocking expensive bulk cable has a business impact beyond the initial purchase.

As an example, consider a manufacturing company that needs to purchase 30 spools of cable for their program. Each cable is specific to certain equipment and cannot be used in other areas of the machine. Price discounts are not provided because of the low volume. At the end of a three-year period, the remaining cable will be discarded.

Using the **MISUMI website**, it is possible to estimate real-world cable costs associated with this project. Cable spools typically contain 100 or 305 meters of material. Under normal circumstances and to properly stock the maintenance crib, this company must spend the following:

| Cable Category | Spools | Total Length (m) | Cost |
|---|---|---|---|
| Power | 5 | 1,525 | $7,973 |
| Robot | 8 | 1,005 | $8,113 |
| Data | 7 | 2,065 | $11,317 |
| Wire | 7 | 2,450 | $7,946 |
| Instrumentation | 4 | 400 | $6,454 |
| **Total:** | **31** | **7,445** | **$41,803** |

Over the next three years random lengths of cable will be cut from the spools by maintenance technicians. At the end of the program, the following amount of cable remains in the maintenance crib:

| Cable Category | Consumed (m) | Total Length (m) | Value |
|---|---|---|---|
| Power | 96 | 1,429 | $7,288 |
| Robot | 204 | 801 | $6,262 |
| Data | 679 | 1,386 | $7,141 |
| Wire | 430 | 2,020 | $6,445 |
| Instrumentation | 164 | 236 | $3,868 |
| **Total:** | **1,573** | **5,872** | **$31,004** |

In this case, only 25% of the purchased cable is used. The rest sits on the shelf until it is discarded. This excess occurs because the company is forced to purchase large bulk items when consumption is unclear.

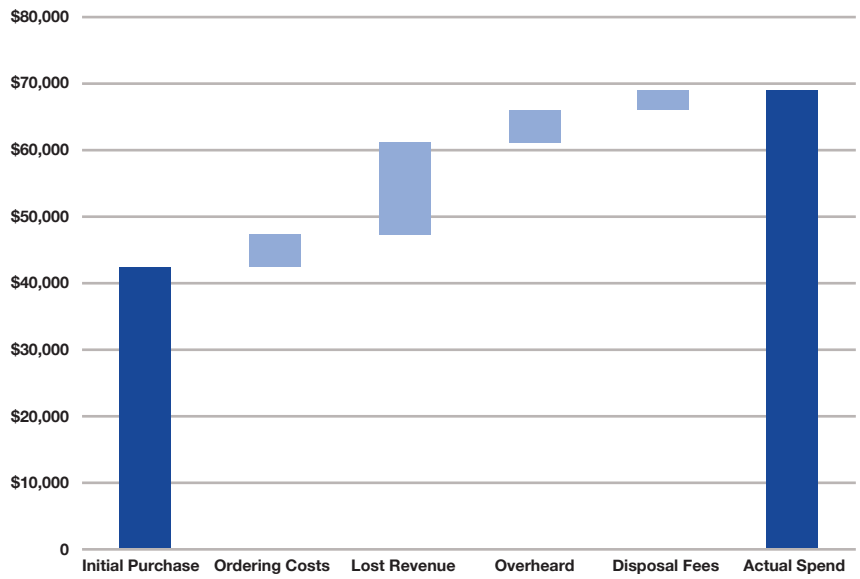
## The Hidden Costs of Visible Cable

At first glance, the overall loss appears to be unused cable discarded at the end of the program. This cost is calculated by multiplying the remaining cable by the average cost per length. In this case, the average cost per meter is $41,800 divided by the 7,445 meters purchased or $5.60 per meter. Multiplying this value by the remaining 5,872 meters results in $31,000 worth of unused cable sitting in the maintenance crib.

However, this represents only a portion of the costs associated with the cable. Purchasing, storing and discarding the cable throughout the program results in overhead costs. Basic estimates reveal some of the additional costs associated with keeping excess cable:

| Category | Description | Estimated Cost |
|---|---|---|
| Ordering Costs | Cost to generate purchase orders | $5,000 |
| Lost Revenue | 15% return on invested capital | $14,000 |
| Overhead | Costs of the cable storage area | $5,000 |
| Disposal Fees | Heavy bulk cable handling | $3,000 |
| **Total:** | | **$27,000** |

These additional costs are equal to almost 90% of the remaining cable value – a large amount to keep the product on the shelf. This increases the required capital investment to 165% of the initial order:

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The cash used to purchase this cable cannot be used in a profitable area of the business. A business leader will consider this as lost revenue. If the company normally makes a 15% return on their investments, then it is safe to estimate that it costs this much each year to keep the money tied up elsewhere. Instead of buying new machinery, raw material, or other profit-making inputs, it is tied up as cable destined to be scrap.

These unseen costs increase the actual spend to $68,803.

Similarly, the initial average cost per meter of the cable appears to be $5.61. When the actual spend is averaged over the total cable used, the real cost per meter is $43.74 – nearly eight times the original estimate.

## Reducing Cable Stock While Maintaining Accessibility

Any solution to this problem must satisfy two criteria:

1. Significant savings must occur to justify the operational change, and
2. Enough cable must still be on hand to keep a machine running.

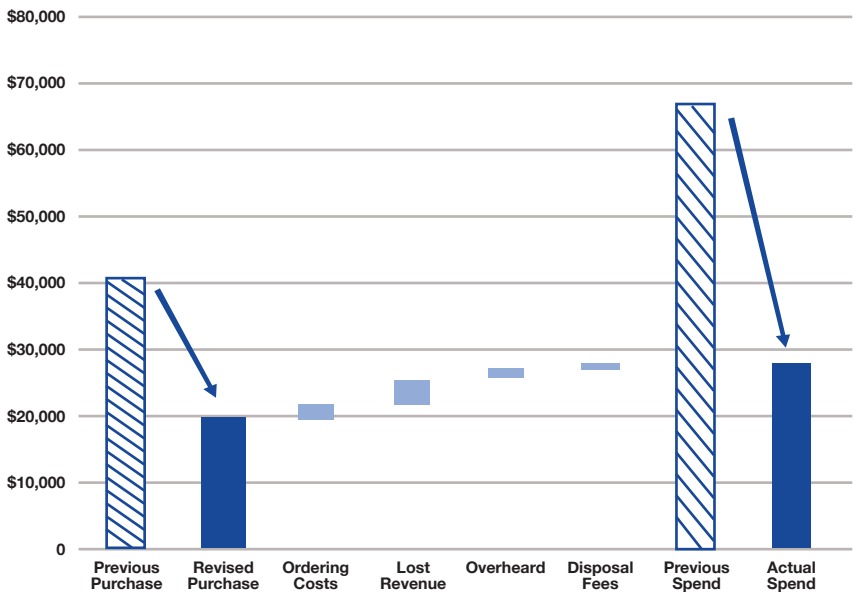
MISUMI offers many of these cables in smaller spools and custom lengths. These are stocked and cut at MISUMI for same-day shipping. This service allows a manufacturer to comfortably reduce their overall inventory and save money.

Most suppliers only offer the cables in large spools of either 100 or 305 meters. For many cables, MISUMI allows customers to purchase in specific lengths or more manageable volumes of 10, 20, or 50 meters. A safe bet is for any company to order a bit more than estimated but far below what other suppliers require.

In the example above, the manufacturer uses 25% of its stocked cable. Using MISUMI's service will allow them to reduce their initial order and have enough for an emergency. This manufacturer can reduce their initial spend to $20,060 and realize a reduction in additional costs:

| Category | Description | Estimated Cost |
|---|---|---|
| Ordering Costs | Cost to generate purchase orders | $2,250 |
| Lost Revenue | 15% return on invested capital | $4,100 |
| Overhead | Costs of the cable storage area | $1,300 |
| Disposal Fees | Heavy bulk cable handling | $800 |
| **Total:** | | **$8,450** |

Comparing this new actual spend to the previous reveals an opportunity for significant savings:




This manufacturer could save nearly 60% over the life of the program. Purchasing less cable reduces the initial investment and the unseen costs associated with maintaining this inventory. Instead of spending $68,803, they will only spend $28,519.

The average cost per meter of cable used decreases the most. Instead of spending $43.74 per meter, this service allows the manufacturer to reduce this to only $7.29. This is 17% of the original unit spend, representing tremendous savings.

## Conclusion

This is a theoretical example of potential savings but represents a real problem for companies. Manufacturers do keep tens or even hundreds of spools of specialty cable on hand in case of an emergency.  Most of this cable will never be used and collect dust until it is discarded.

Finding new ways to save money requires an examination of maintenance spend and overall use. This study will reveal how much spare cable was used and can be compared to the initial estimate of what would be used.

In the event this example underestimates the amount of material purchased, the savings ratios are unlikely to change very much. Even a 50% savings will realize a large benefit especially if the total specialty cable on hand is a multiple of what is used in this white paper. The goal is to reduce waste, which will undoubtedly result in extra cash on hand.

MISUMI can help cut cable spend by cutting cables for customers. Getting started on a path to savings is easy. Anyone can start this process by reaching out to MISUMI.

**Email the team at electrical@misumiusa.com**

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