

## Technology Brief

# MODIFYING RECYCLED CLOTHING SORTING PROCESSES

### Background

The Greater Cleveland Recycling Initiative (GCRI) identified Ohio Mill Supply, a small clothing recycler located in Cleveland, as a company that has developed markets for used clothing recycled in Northeastern Ohio. Ohio Mill Supply exports 1.1 million pounds of used clothing annually to West Africa (Ghana) and is developing markets in Mexico and Eastern Europe.

There are ample supplies and sufficient overseas demand for this business to expand, but inefficient sorting practices result in excessive operating costs, limiting the company's capability to grow. CWC funding was provided to CAMP, Ohio's NIST Manufacturing Extension Center, to evaluate Ohio Mill Supply's operations and recommend changes that could significantly increase the flow of recycled clothing through the facility.

### Introduction

Ohio Mill Supply operates a manual sorting facility for recycled clothing that processes approximately 1132 tons of recycled clothing per year. Clothing is processed and shipped to these separate markets:

- "Brand-name" and other perceived "high-value" clothing is supplied to second-hand clothing stores (3.7% of total received);
- Lightweight clothing of poorer condition is shipped to overseas markets (48.6% of total received);
- Unwearable cotton clothing is cut and sold in bales as wiping rags (31.8% of total received); and
- Heavily worn and/or damaged synthetic clothing, about 16% of total received must be disposed of as trash..

### Key Words

**Materials:** Recycled Clothing.

**Technologies:** Sortation.

**Market Goals:** Increased international markets.

**Abstract:** Optimize sortation at a clothing recycler's operations to significantly increase throughput.

### Assessment Findings

The facility performs receiving, material transfer between stations, primary sorting, secondary sorting, weighing, bailing, and shipping.

The existing manual clothing sorting process is inefficient in many ways. Examples include:

- Material storage in processing areas impedes sorting and handling.
- Poor labeling requires time for identification of container locations constantly.
- Twenty-three sorting categories require intense concentration.
- Secondary sorting space is too small; the backlog of clothing taken to storage after the primary sort indicates that the existing secondary sorting operation is a process "bottleneck."
- Material handling is excessive, including use of forklifts in a facility that is not "fork-lift friendly."
- The scale is hard to use and read.
- Storage of unsorted clothing and packaging trash in processing areas impede material movement (approximately 80% of the facility's available floor area stores clothing that has little or no value.



## Recommendations

The recommendations presented as a result of this assessment are intended to optimize manual sorting efficiency, material handling, and facility layout. Redesigning the sorting workstations, decreasing distance between stations, employing conveyors and wheeled carts instead of forklifts, using material handlers, and eliminating storage in production areas will significantly decrease material handling. Ohio Mill Supply must re-align and balance the workforce to eliminate the bottleneck at the secondary sort. General cleanup and elimination of unnecessary storage improve process and material flow. Some additional, more specific recommendations follow:

### Receiving:

- Remove and dispose of all packaging outside the building.
- Install a conveyor to transport bulk clothing.

### Raw Material Storage:

- Eliminate boxes and bags to store raw material: use bulk storage only.

### Primary Sort:

- Purchase and install a lift table for the primary sort platform.
- Use wheeled carts instead of forklifts.
- Reduce the number of sort categories.
- Reduce the number of primary sorters.

### Secondary Sort:

- Add more sorting tables/space and sorters (to balance material flow with the primary sort operation).

### Weighing:

- Install digital floor scale which will significantly decrease the amount of time and handling required to accurately weigh each batch of sorted clothing.

- Use material handler to weigh carts.
- Use wheeled carts as weighing containers.

### Packaging/Shipping:

- Reduce finished product and low-value inventory.
- Use forklifts only for shipping; use conveyors and wheeled carts for other material movement.
- Identify storage areas and forklift lanes by painting floor.

### Conclusion

After Ohio Mill Supply implements these recommendations, CAMP and its GCRI partners will monitor facility throughput to ensure that plan implementation produces positive results.

CAMP estimates that the proposed facility changes will enable the company to increase its throughput by at least 50% with minimal capital investment. The increased capacity will enable the Cuyahoga County Solid Waste District in conjunction with its GCRI partners, to establish textile recycling programs in local communities.

The expected 50% facility throughput increase would provide processing capacity for 566 additional tons of used clothing per year. Total estimated additional revenues would be \$687,000 and total estimated additional operating expenses: \$67,383. At an estimated project implementation cost of \$25,000, the project payback period could theoretically be as short as 15 days assuming markets are immediately available for the additional output.

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### For More Information

For more information call CWC at (206) 464-7040, email [info@cw.org](mailto:info@cw.org), or visit the CWC Internet Website at [www.cw.org](http://www.cw.org).

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**CWC is a division of the Pacific NorthWest Economic Region, 999 Third Avenue, Suite 1000, Seattle, Washington, 98104**