YAMAHA
Revs your Heart

Example in Automotive Industry | Target: Tact improvement

Increasing productivity per line for cost reduction

Before

User:

Need equipment with improved productivity

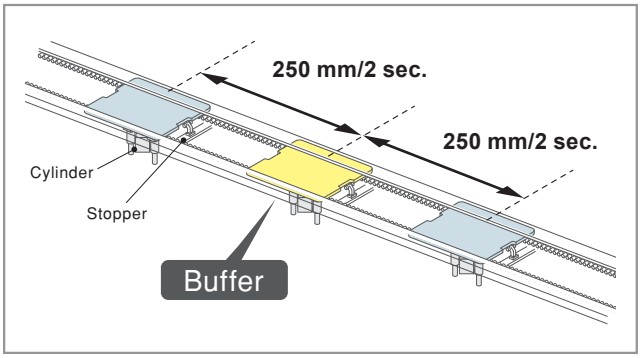
Possible options:

- Increase the number of production line
- Reduce processing time
- Increase transfer speed between work stations
- Optimize operation by reducing frequent short line stops

Ordinary upgrade options:

Productivity improvement is limited due to long transfer time between work stations

- Carriage positioning time at each work station with stopper and pneumatic cylinder
- Buffer is required between work stations
- Frequent short line stops resulting from numbers of sensors required in line



After

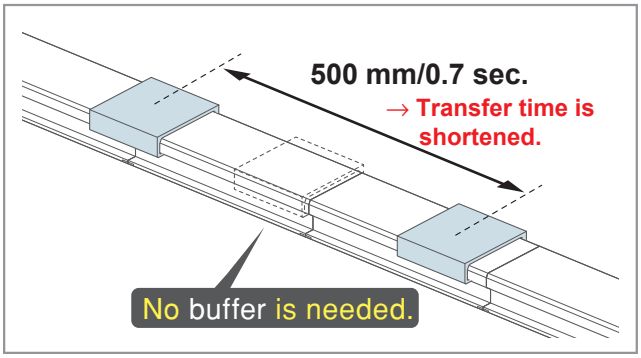
Yamaha's answer to user's needs:

High speed transfer and high precision positioning of LCM

- Reduction of transfer time by high speed LCM
- Eliminates buffer with reduced transfer time
- High precision positioning by absolute point data entry

Operating time of LCMR200 [Unit: Sec.]

Payload \ Transfer distance	250mm	500mm	1000mm
2kg	0.47	0.60	0.79
5kg	0.55	0.71	0.94
10kg	0.68	0.90	1.21



- Max. speed: 2,500 mm/s
- Repeatability: +/-5 µm (single slider)

* The operating time is calculated when the tolerance is +/-0.005 mm. As the tolerance is increased, the operating time is shortened.

Results:

The production volume is increased by approx. 23%. Cost of jigs reduced

Production volume Approx. 23% UP!

<Example> Estimation based on 8 operation hours per day and operating ratio of 100%.

	Transfer time	Work time	Total time	Production volume per hour	Production volume per day
Conventional conveyor	2 sec.	5 sec.	7 sec.	514 pcs.	4,112 pcs.
LCM	0.7 sec.	5 sec.	5.7 sec.	631 pcs.	5,048 pcs.

Manufacture cost is greatly reduced by increasing the production volume.

User testimonial

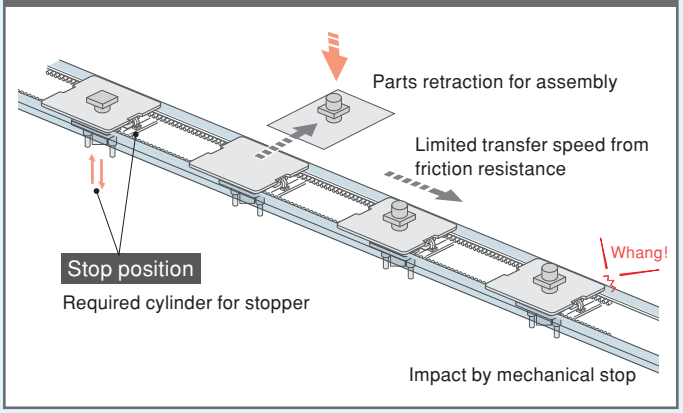
Automotive parts manufacturer
People in charge of
production engineering

Both tact time and production time percentage are improved and production volume has exceeded the target.

In the past, in order to increase the production volume, we have done several KAIZEN actions focusing on shortening production time and increasing production percentage. The result was somewhat successful, however, by reducing the operation time, frequency of short line stops was not reduced and production volume was not increased as expected. Then I learned LCM of Yamaha at an exhibition and saw some potential in it for increasing production volume. So we started an evaluation. Our feasibility study on LCM concluded that a reasonable ROI is expected so, we made a decision and started designing production line with LCM. Once the operation started we saw substantial reduction of transfer time and number of in-process workpiece which met our target. From the reduction of transfer time, we no longer needed to squeeze assembly cycle time of robot operation. As a result, frequency of short line stops by transfer error has been greatly reduced and that assembly line has become a model line in our plant. LCM greatly improved the production rate of the line and as a result the production volume has exceeded our original target. As a staff in charge, I believe choosing LCM was a right decision.

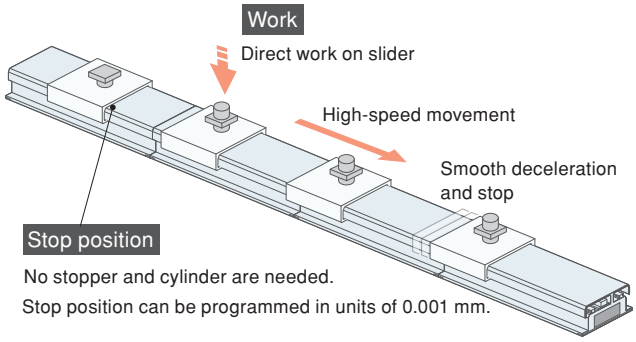
LCM and conventional conveyor system (Comparison with conventional method)

Conventional conveyor

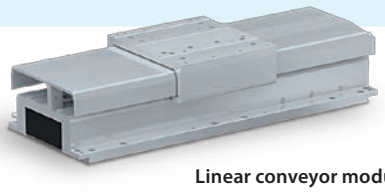


Multiple cylinders with sensors and solenoid valves need to be controlled. This required hours of software development, wiring, and mechanical adjustment. Complicated design and multiple components often cause frequent line stops.

LCM



Simple structure of motors and sensors makes installation of LCM simple and easy. Wiring and mechanical adjustment process becomes easier. Reduced number of sensors helps software development time and improve frequency of stopping operation.



Linear conveyor module
LCMR200

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