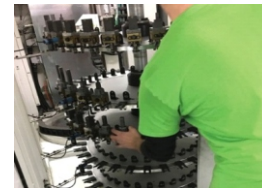
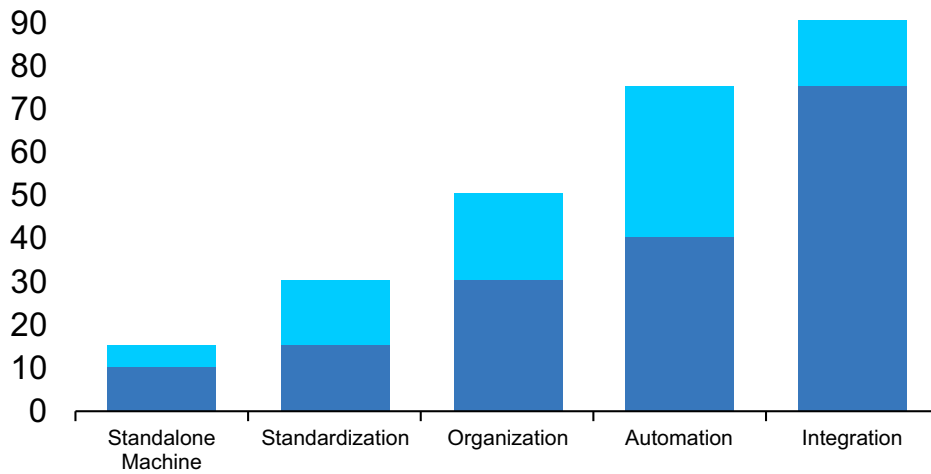


Creating a Predictable Process for Standard Pallet Automation

Utilization of standard sized off the shelf pallets for part transfer



Utilization Rates Available in the Automation Process



INTEGRATION

75-90% CNC machine with integrated tooling, pre-setter, robot and cell controller



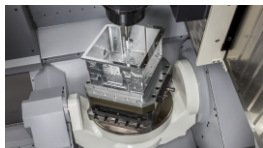
AUTOMATION

50-75% CNC machine with integrated tooling, pre-setter and robot



ORGANIZATION

30-50% CNC machine with integrated tooling and pre-setter



STANDARDIZATION

15-30% CNC machine with integrated tooling

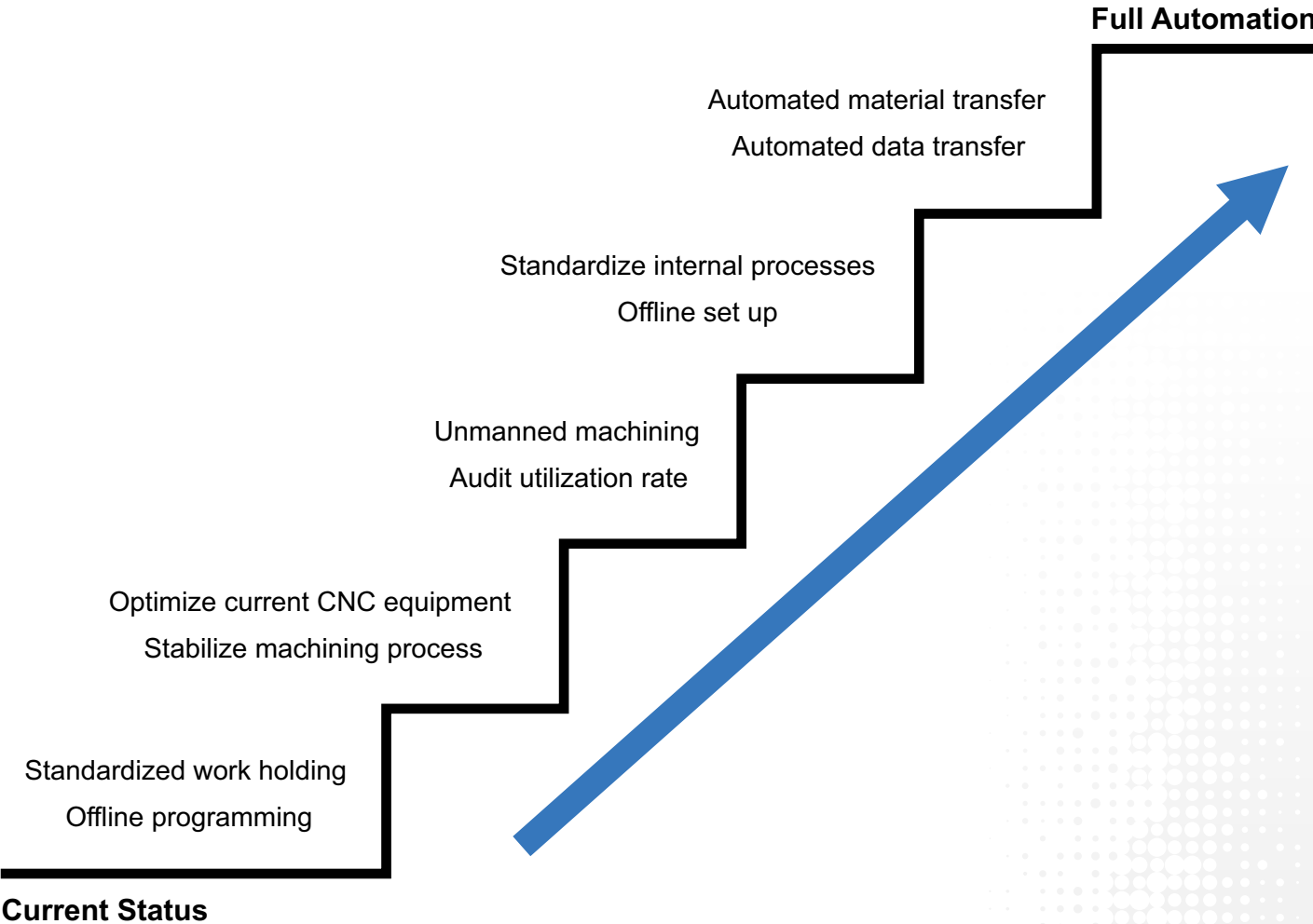


STANDALONE MACHINE

10-15% CNC machine without integrated tooling

* Based on low volume/high mix applications in-cycle times

Makino's Automation Proposal Engineer will interview your current process and help you define your goals. They will then guide you through the entire Automation Stairway process.



Makino can provide integrated tooling solutions to fully integrated systems



- Basic/standalone CNC machine with integrated tooling
- Single or multiple machine cells
- Complex/machine cells
 - Linear arrangement
 - Pre-setting
 - Loading station
 - CMM
 - Parts washing, drying
 - Centralized cell control software

Examples of Levels of Automation

Interface Type 1

Machine Master / Robot Slave

- No cell controller
- Process data is created/managed by operator



Interface Type 2

2 Machine Masters / Robot Slave

- No cell controller
- Process data is created/managed by operator



Examples of Levels of Automation

Expanded Type 1 Cell

Machine Master / Robot Slave

- No cell controller
- Process data is created/managed by operator

Master
(EDM Sinker)



Master
(EDM Sinker)

Slave (Robot + Pallet Storage)

Interface Type 2 Cell

Cell Controller Master / Robot Slave

- All process data is managed by cell controller



Slave
(Robot + Pallet Storage)



Master
(Cell Controller)



Slave
(EDM)

Examples of Levels of Automation

Interface Type 2 Cell

Cell Controller Master and Robot Slave

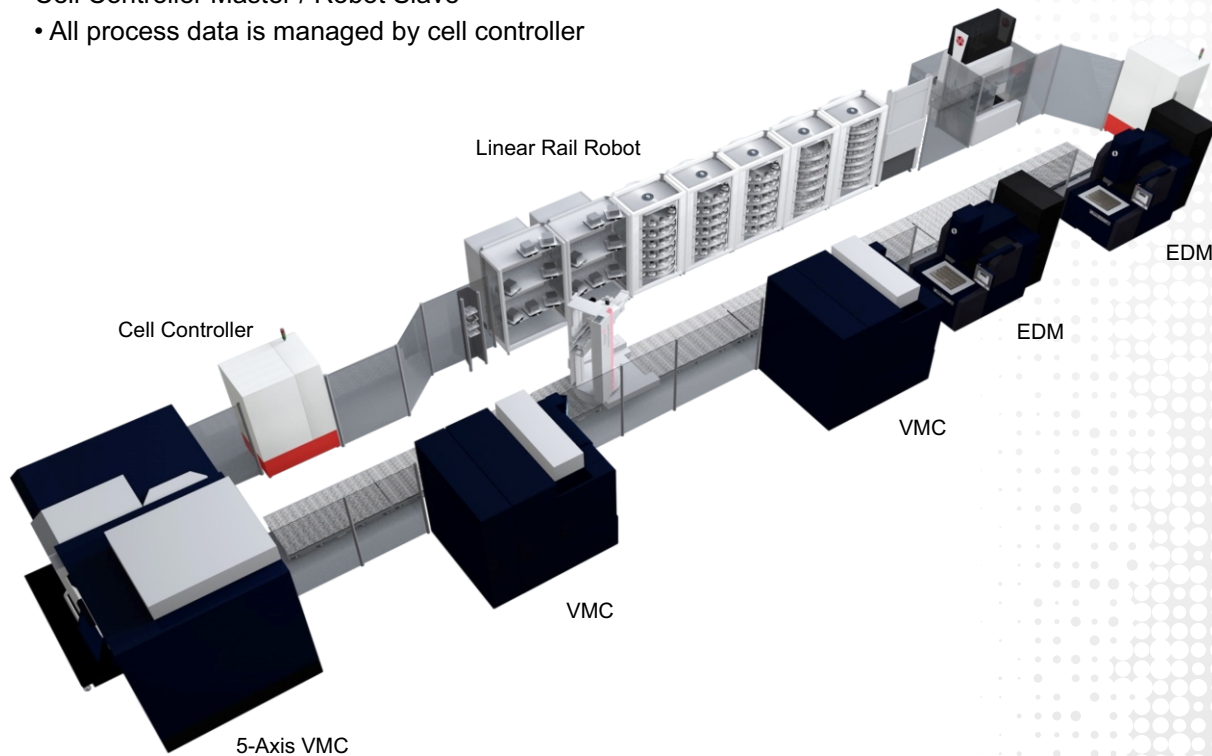
- All process data is managed by cell controller



Expanded Interface Type 2 Cell

Cell Controller Master / Robot Slave

- All process data is managed by cell controller



Myth

Automation only applies to large production machine shops...but not small shops



Makino will help you from defining standard processes to complete high-level automation.

Contact Makino for an Automation Interview to guide you through the key components of Automation.