



Assessment of Text Analytics Technology for Maintenance of Manufacturing Equipment

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Vice President, Chief Technology Officer

2019

TechSolve, Inc. - Overview



- Machining process solutions, IIoT solutions, and Business advisory
- State and Federal Manufacturing Extension Partnership (MEP) Center
- Engineers, MBAs, PhDs, former business owners
- Fully instrumented Machining Laboratory

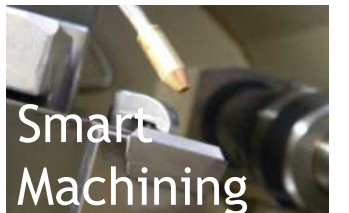
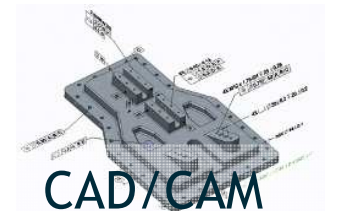
Smart Manufacturing at TechSolve



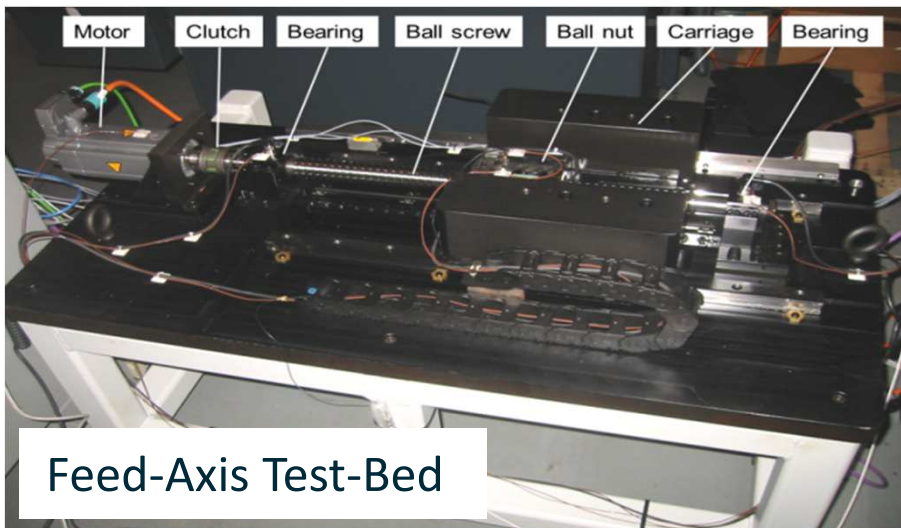
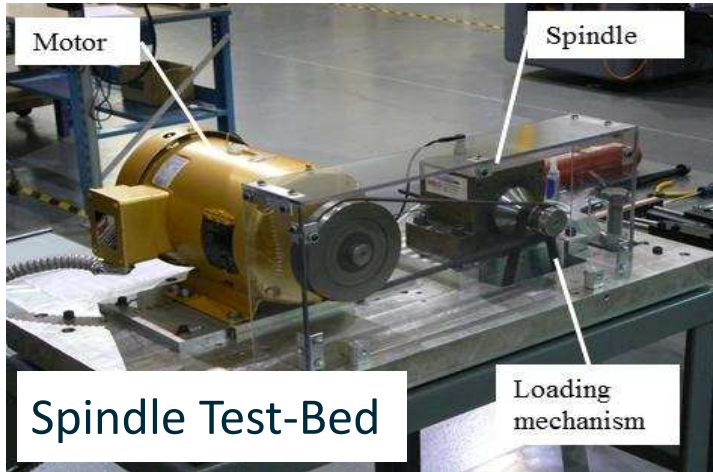
We leverage emerging technologies, best practices, and digital tools to enhance the way our clients work.

TechSolve's Technology Development Center

- Mitsui Seiki Blue Arc® Machine
- Mazak Integrex i200S Mill Turn
- Makino V55 - 3 Axis VMC
- DMG DMU-50 - 3+2 Axis VMC w/Siemens 840D CNC
- DMG DMU-70 eVo Linear - 5 Axis VMC w/ Siemens 840D
- Hardinge Cobra 65 - 2 Axis turning center w/Fanuc 21T
- Milltronics HMC35 - 4 Axis HMC
- Chevalier Smart B1224II Grinding
- Sheffield Cordax D-8 CMM



PHM Test-Beds at TechSolve



- All TechSolve's machine-tools are connected to IIoT
- Spindle and Feed axis test-beds are used for degradation tests



Assessment of Text Analytics Technology

Project Scope

- Conduct an assessment of the capabilities of text analytics technology developed by NIST, using maintenance data from manufacturing organizations.
- Contact small and medium size organizations to determine their practices relative to logging maintenance work orders

Sample Companies

No	NAICS Code	Employees	Annual Sales
Company 1	332119 - Metal Crown, Closure, and Other Metal Stamping (except Automotive)	50	\$19M
Company 2	336350 - Motor Vehicle Transmission and Power Train Parts Mfg	200	\$37M
Company 3	333514 - Special Die and Tool, Die Set, Jig, and Fixture Mfg	50	\$10M
Company 4	442299 - All Other Home Furnishings Stores	10	\$1.5M
Company 5	334413 - Semiconductor and Related Device Mfg	150	\$48M

Points of Discussion

- What could improve your day-to-day maintenance tasks?
- How would you want to improve your maintenance long term?
- Why do you capture maintenance work order (MWO) data?
- Do you use this MWO data in your current maintenance analysis?
- What data do you use to determine your maintenance strategy?

MWO Collection Patterns

- Description of what was done
- Time to repair
- Date
- Who did repairs
- Why did repair need to take place
- Priority
- Code
- Assets
- Location Name
- Description
- Type
- Status
- Date Created
- Date Completed
- Completed By Users
- Requested by
- Time Est Hours
- Time Spent Hours
- Completion Notes
- ... (17 headers)
- WorkOrderId
- WorkOrderNo
- Name
- ParentWorkOrderId
- ParentWorkOrderNo
- WOStatusId
- WOStatusNo
- WOStatusName
- PriorityId
- PriorityNo
- PriorityName
- WorkCategoryId
- WorkCategoryNo
- WorkCategoryName
- Etc. (over 400 headers)

Observations

- The companies compliant with ISO 9001 and AS9100 are more likely to have maintenance work order data
- The companies that have maintenance records typically use a maintenance management system and the work orders are logged into a database
- All companies expressed the desire to get better analytics and ways of visualizing data that would allow them to better understand the maintenance activities and extract actionable information

Thank you !

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