Assessment of Text Analytics Technology for Maintenance of Manufacturing Equipment

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Vice President, Chief Technology Officer

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