3D Digital Twin for Bottling

Sight Machine Factory Operate With NVIDIA **Omniverse Enables 3D Visualization of Line Performance, Rapid Troubleshooting, and Root Cause Analysis**

Performance Improvement Use Case: Bottling Industry





Line Running Well, but Opportunity to Improve

- Bottling line is running well all machines are operating smoothly
- USLE (Line Efficiency) is on target, and production schedules are on track.
- However, there are performance improvement opportunities to maximize throughput

| , 1 | San Francisco | > Line 1 👻 | | | | | | |
|-------------|--------------------------------|-----------------------------|-----------|-------------|---------|-------------|--------------|------------|
| | Line 1 | | | 0.072 | 1 | ref l | | 7 |
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| | This Shift | • | | 1 | here | 14 18 - 17- | a real | TH |
| | Machine Effic 81.82% | ciency | | | | | | |
| | Filler 1 Speed 980 | d (Avg.) | | | 186601 | | | HIIIII |
| - | Filler 2 Speed 943.3 | d (Avg.) | 1 | | whe | **** | | ange ben u |
| | Production V 570 | /olume (Cases) | T | | I | | | TANK |
| An and an | Flavor Vintage | | | | | | | |
| | | | 🚺 L1 – De | epalletizer | | L1 – Emp | oty Can Conv | eyor |
| - accounter | Line is running efficiency. | well, but not at peak ZE | Status | 1 0 M | Running | | | |
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| | FACILITY | DOWNTIMES | LOSS TREE | CENTERL | INES C | SIL . | | |

Next: Click on WAYS TO OPTIMIZE





L1 – Blender #1

Status

Running

L1 – Filler #1 (1A)

Status Curr. Speed Avg. Speed Runnir 137 98

Performance Improvements at Line Level

- Sight Machine surfaces "Optimization Recommendations" panel with suggestions for targeted improvements across line
- Specific machines are highlighted:
 - Filler
 - Accumulation Area 1
 - Packer
- Opportunity improvements are visually highlighted on the 3D visual, right panel



Next: Click on **GO TO EQUIPMENT** at L1 Filler

Focus First on the Critical/Bottleneck Asset (Filler)

- The Filler is the critical asset on the line (aka the bottleneck asset) and determines its maximum throughput
- The Filler's sub-optimal speed is highlighted, with a recommendation: Increase Filler Speed to 1,100 cpm for optimal throughput and to stay on track with current production schedule





Surface Filler Speed Increase Based on Operator Action

- The operator has increased the speed of the Filler to the Sight Machine-recommended value
- Surface the Filler Speed, now at 1,100 cpm
- Highlight the impact of this increased speed
 You will now meet your current order 8%
 - faster
- Recommendation followed; Filler turns from purple to green

Next: Click on Back to Recommendations





Line View: Downstream Impact

- Downstream machines must now adapt to the higher production pace at the Filler machines
- Two machines downstream from the Filler are highlighted as focus areas for targeted improvements:

Next: Click on GO TO EQUIPMENT at Accumulation Area 1

- Accumulation Table 1
- Packer

San Francisco > Line 1 👻 Line 1 1418-17-181645 TIME This Shift Machine Efficiency 81.82% Filler 1 Speed (Avg.) 1100 Filler 2 Speed (Avg.) 943.3 Production Volume (Cases) 570 Flavor Vintage L1 – Depalletizer L1 – Empty Can Conveyor Status Running FACILITY DOWNTIMES LOSS TREE CENTERLINES CII



Highlight Accumulation Area 1 for Monitoring

- Accumulation Area 1, downstream of the Filler, is impacted by increased production at the Filler
- Fill Status is increasing from 55% to 62%, since Packer machine, downstream from Accumulation Area 1, is still at the same speed
- If accumulation continues, the Filler could become blocked and have to slow down

Next: Click on Back to Recommendations





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|--|---|---------------------|------------|--|--|
| 1 A | Accumulation Area 1 X | | | | |
| | | DMMENDATIONS | | | |
| R. | O Downstream machines must match upstream pece to maintain flow. Adjust them now to prevent Filler backup in 10 minutes. | | | | |
| | Fill Status 55.05% | | | | |
| | Average Max Speed 730 cpm | | | | |
| | Downtime 28.00 min | | | | |
| | Frequency Dawn 1 min | | | | |
| | MTBF 138.00 min | | | | |
| | MTTR 14.50 min | | | | |
| | | | | | |
| L1 – Blender #1 | | L1 - Filler #1 (1A) | | | |
| Status | Running | Status | Runnir | | |
| | | Avg. Speed | 137 | | |
| and the second sec | A suplimine of | | | | |

Line View (Once Again)

- Sight Machine surfaces "Optimization Recommendations" panel with remaining suggestions
 - Observe Fill Status at Accumulation Area 1
 - Increase speed by 15% at Packer

Next: Click on GO TO EQUIPMENT

at Packer #2



Highlight Recommended Speed at Packer

- The Packer needs to keep up with the Filler, which is producing bottles at a faster pace than before
- The Packer's sub-optimal speed is highlighted, with a recommendation:
 - Increase Packer Speed to 570 cpm to match Filler pace and optimize production flow





Surface Packer Speed Increase Based on Operator Action

- The operator has increased the speed of the Packer to the Sight Machine-recommended value
- Surface the Packer Speed, now at 570 cpm
- Highlight the impact of this increased speed
 - Production flow is now reflecting maximum throughput on the line without backing up the Filler
- Recommendation followed; Packer turns from purple to green



Next: Click on Back to Recommendations



| | Packer #3 | | × |
|--------|---|---------------------------|--------|
| | The production flo | w is now reflecting maxim | .m. |
| | Filler. | me without backing up the | |
| | 570 cpm Average Max Speed 730 cpm | 1 | |
| - | Downtime 28.00 min | | |
| | Frequency Down 1 min | | |
| | MTBF 138.00 min | | |
| | MTTR 14.50 min | | |
| | | | |
| Ctotuo | Dunning | LI – Filler #1 (1A) | Dunnin |
| Sidius | Running | Curr. Speed | 137 |
| | | Avg. Speed | 110 |

Line Running at Maximum Throughput

- USLE and Machine Efficiency for Filler and Packer are higher than before
- Line now running at maximum throughput!
- All machines in green on 3D visual

| s | an Francisc | so > Line 1 🔻 | | | | | - |
|---------|--|---|------------|-----------|---------|---------------|------------|
| | Line 1 | | | | | | 8 |
| 11 | TIME | | | 1 | | | |
| | This Shift | • | | | 120 1 | 110-11-111 | |
| | Machine E ⁻ 81.82% | fficiency | | | | | |
| | Filler 1 Spe 1100 | eed (Avg.) | | innu | E | | |
| - | Filler 2 Spe 943.3 | eed (Avg.) | 1 | | net a | | |
| ALC: NO | Productior 570 | n Volume (Cases) | T | | | | 0. |
| A CON | Flavor Vintage | | | | | | |
| | | | 📔 L1 – Dep | alletizer | | L1 – Empty Ca | n Conveyor |
| | Nice work! T boosts effic machines at CLOSE | The dynamic flow iency, keeping all t full capacity. Props! | Status | | Running | | |
| tet. | 3555 | | | 把人开始 | 利用用 | 11 | |
| | FACILITY | DOWNTIMES | LOSS TREE | CENTERLI | NES CIL | | |





L1 – Blender #1

Status

Running

L1 – Filler #1 (1A)

Status Curr. Speed Avg. Speed Runnir 137 11C