

Digital A3

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A3 Digital A3
QUALITY & LEAN EXCELLENCE

+ NEW A3 REPORT

Executive Dashboard

A3 Builder

Knowledge Base

ML Workbench

kemal dorak
PROFILE SETTINGS

LOG OUT

+ LAUNCH INITIATIVE

Executive Control

Strategic oversight for organizational problem-solving.

INITIATIVES TRACKED

9

TOTAL A3 REPORTS IN YOUR REPOSITORY

VERIFICATION PROGRESS

18%

13/72 A3 STEPS VERIFIED

ACTION COMPLETION

10%

10/100 ACTIONS COMPLETE

Problem Solving Inventory 8 OPEN INITIATIVES

| STRATEGIC INITIATIVE | TIMELINE | PHASE STATUS | ACTIONS | UTILITY |
|---|----------|---------------------------------------|-------------------------------------|-------------------------------------|
| A3 GH-M1 CNC-07 Unplanned Downtime ... KEMAL DORAK | | COMPLETE 8/8 STEPS VERIFIED | <div style="width: 24%;"></div> 24% | + - |
| A3 Inventory Record Accuracy to Reduce... KEMAL DORAK | | DRAFT 0/8 STEPS VERIFIED | <div style="width: 0%;"></div> 0% | + - |
| A3 Cycle Time Improvement for Commer... KEMAL DORAK | | DRAFT 0/8 STEPS VERIFIED | <div style="width: 0%;"></div> 0% | + - |
| A3 Improve Unplanned Outages in Subst... KEMAL DORAK | | DRAFT 0/8 STEPS VERIFIED | <div style="width: 0%;"></div> 0% | + - |
| A3 DEMO test KEMAL DORAK | | DRAFT 1/8 STEPS VERIFIED | <div style="width: 3%;"></div> 3% | + - |
| A3 Optimizing Batch Yield in Bioreactor ... KEMAL DORAK | | DRAFT 0/8 STEPS VERIFIED | <div style="width: 14%;"></div> 14% | + - |
| A3 Reducing Weld Defect Rates on Asse... KEMAL DORAK | | DRAFT 3/8 STEPS VERIFIED | <div style="width: 50%;"></div> 50% | + - |
| A3 CNC Milling Diameter Variation Reduc... KEMAL DORAK | | DRAFT 1/8 STEPS VERIFIED | <div style="width: 0%;"></div> 0% | + - |
| A3 Reduction of Expedited Air Shipment... KEMAL DORAK | | DRAFT 0/8 STEPS VERIFIED | <div style="width: 0%;"></div> 0% | + - |

Methodology Funnel

EXECUTION INTEGRITY

You have 9 active initiatives. Maintain focus on phase verification to ensure sustainable organizational learning.

A3 **Digital A3**
QUALITY & LEAN EXCELLENCE

+ NEW A3 REPORT

 Executive Dashboard

 **A3 Builder**

 Knowledge Base

 ML Workbench



Smart Methodology Starter

Initialize your A3 with AI Intelligence or a custom canvas.



 **Project with AI Support**
Describe your problem and let AI architect the solution flow.

PROBLEM DESCRIPTION

e.g. The Gearbox Housing machining line is a bottleneck process... over the last 8-12 weeks experienced frequent unplanned downtime on CNC-07...

 **GENERATE AI DRAFT**  **START BLANK CANVAS**

KNOWLEDGE TRANSFER STARTERS

| | | |
|---|--|---|
|  Industrial & Manufacturing BENCHMARKED STRUCTURE |  Pharmaceuticals & Biotech BENCHMARKED STRUCTURE |  Energy & Utilities BENCHMARKED STRUCTURE |
|  Logistics & Supply Chain BENCHMARKED STRUCTURE |  Financial Services BENCHMARKED STRUCTURE |  Academic Research BENCHMARKED STRUCTURE |

STEP 1

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1. Problem Clarification

2 EVIDENCE ARTIFACTS

UPLOAD ATTACHMENT



Step 1: Problem Clarification

Define the current situation and the performance gap.

AI PROBLEM OPTIMIZER



Detailed problem description

A3 NARRATIVE - 1) CONTEXT / BUSINESS CASE

The Gearbox Housing Machining Line (Line GH-M1) at Nordic Drives Plant – is experiencing frequent unplanned downtime on CNC-07, a critical constraint operation. This directly impacts downstream assembly (FA-02) due to material shortages, changeover inefficiencies, and expedited recovery actions. The line is failing to meet planned output, leading to increased costs and delivery risks.

...

NARRATIVE BLOCK

PRIMARY METRIC NAME

Unplanned Downtime

UNIT OF MEASURE

hours/week

BASELINE ACTUAL

6,2

TARGET CONDITION

2

QUANTIFIED GAP

4.2

HOURS/WEEK

VARIANCE

IMPACT MAGNITUDE

ECONOMIC LOSS



Lost throughput and recovery...

Lost throughput and recovery actions are costing €18,000/week.

CAPACITY / TIME



4.5 hours / week

Assembly line FA-02 starved 4.5 hours/week; 24 hours/week

QUALITY / RISK



Increased risk of missed sch...

Increased risk of missed schedules impacting assembly lot deliveries.

UNVERIFY STEP

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1. Problem Clarification

2 EVIDENCE ARTIFACTS

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NARRATIVE BLOCK

| PRIMARY METRIC NAME | UNIT OF MEASURE | IMPACT MAGNITUDE | ECONOMIC LOSS |
|---------------------|-----------------|------------------|---------------|
| | | | |

UNVERIFY STEP

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LIVE REPORT PREVIEW

Fit 37%

STRUCTURED PROBLEM SOLVING ENGINE
GH-M1 CNC-07 UNPLANNED DOWNTIME REDUCTION

OWNER: GLOBAL OPERATIONS LIA | OWNER: KEMAL DORAK

PROJ. STATUS: COMPLETE | CYCLE DATE: 10/25/2024

PROBLEM CLARIFICATION

The Gearbox Housing Machining Line (Line GH-M1) at Nordic Drives Plant – is experiencing frequent unplanned downtime on CNC-07, a critical constraint operation. This directly impacts downstream assembly (FA-02) due to material shortages, changeover inefficiencies,

ENVIRONMENTAL ACTIONS

- Investigate the root causes of the unplanned downtime on CNC-07.
- Implement a preventive maintenance program for CNC-07.
- Optimize the changeover process for CNC-07.
- Improve the material handling process for CNC-07.

PROBLEM ANALYSIS

ROOT CAUSE ANALYSIS

The root cause of the unplanned downtime on CNC-07 is identified as material shortages, changeover inefficiencies, and maintenance issues. The following actions are recommended to address these issues:

- Investigate the root causes of the unplanned downtime on CNC-07.
- Implement a preventive maintenance program for CNC-07.
- Optimize the changeover process for CNC-07.
- Improve the material handling process for CNC-07.

CONTINGENCY PLAN

Implement a contingency plan to address the unplanned downtime on CNC-07. This includes identifying alternative suppliers, increasing inventory levels, and implementing a backup plan for critical components.

CHECK RESULTS MONITOR

3.2

STANDARDS & DATA

DEVELOPED BY KEMAL DORAK

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2. Containment Actions

UPLOAD ATTACHMENT



EMERGENCY RESPONSE BOARD

STEP 2: QUARANTINE & CONTAINMENT

AI SUGGEST QUARANTINE

+ NEW STOP-GAP

ACTIVE STATUS

Implement 24-hour monitoring of CNC-07 to detect and immediately address abnormal system errors.

Maintenance ... 15/07/2024

ACTIVE

VERIFIED STATUS

Increase the frequency of preventative maintenance checks on CNC-07 to every 48 hours.

Maintenance ... 12/07/2024

VERIFIED

ACTIVE STATUS

Establish a temporary buffer of 2 days of gearbox housings before FA-02 to mitigate material starvation.

Production PL... 10/07/2024

ACTIVE

ACTIVE STATUS

Conduct daily performance review meetings with operators to identify early warning signs of machine failure.

Production M... 08/07/2024

ACTIVE

DRAFT STATUS

Verify proper execution of the standard operating procedure (SOP) for CNC-07 startup and shutdown processes.

Quality Assu... 11/07/2024

DRAFT



Barrier Health

1 of 5 containment verified. Risk reduction: 20%.

SYSTEM MONITORING ACTIVE

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3. Problem Analysis & Breakdown

UPLOAD ATTACHMENT



Step 3: Point of Cause Discovery

Quantify and prioritize the Vital Few.

AI INTELLIGENCE BREAKDOWN

PROBLEM BREAKDOWN

+ ADD FACTOR

OVERALL EQUIPMENT EFFECTIVENESS (OEE)

OEE

59 %

FALLING

OUTLIER

MEAN TIME BETWEEN FAILURES (MTBF)

MTBF

3,2 HOURS

FALLING

OUTLIER

MEAN TIME TO REPAIR (MTTR)

MTTR

1,8 HOURS

RISING

OUTLIER

DOWNTIME FREQUENCY

DowntimeEvents

12 EVENTS/WEEK

RISING

OUTLIER

MATERIAL SHORTAGES AT FA-02

MaterialShortages

8 OCCURRENCES/WEEK

RISING

OUTLIER

PARETO PRIORITIZATION

+



RANK / CATEGORY

FREQUENCY

| | | |
|---|------------------------|----|
| 1 | Electrical Failures | 40 |
| 2 | Hydraulic System Leaks | 25 |
| 3 | Software Glitches | 15 |
| 4 | Mechanical Wear | 10 |
| 5 | Sensor Malfunctions | 10 |

VITAL FEW CONCLUSION

CNC-07 is experiencing excessive unplanned downtime due to a combination of electrical, hydraulic, software, and mechanical issues, leading to OEE degradation and material flow disruptions affecting downstream assembly FA-02. Addressing these high-frequency failure modes is crucial for operational improvement.

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DEVELOPED BY KEMAL DORAK

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4. Target Setting

UPLOAD ATTACHMENT

Step 4: Target Setting

AI TARGET OPTIMIZER

BASELINE TARGET STATE

6,2 HOURS/WEEK → 07.7% Reduction → 2 HOURS/WEEK

GOAL STATEMENT

Reduce unplanned downtime on CNC-07 in Gearbox Housing Machining Line GH-M1 to improve material flow to downstream assembly FA-02, decrease operational

EXECUTION PATHWAY

PHASE GATES

- 5 COMPLETE DETAILED FAILUR 15/07/2024
- 4 IMPLEMENT TOP 3 COUNTER 15/08/2024
- 3 VERIFY 15/08/2024

NEW PHASE

SUCCESS CHECKPOINTS

- Sustain
- Achieve
- Reduce
- Decrease

UNVERIFY STEP

A3

GH-M1 CNC-07 Unplanned Downtime Reduction

STEPPER

SPLIT VIEW

REPORT

EXPORT

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5. Root Cause Analysis

UPLOAD ATTACHMENT

5-WHYS

FISHBONE

AI PRIORITIZE VITAL CAUSES

Ishikawa (Fishbone) Analysis

Structured brainstorming to uncover systematic Point of Causes (PoC).

AI CATEGORIZE CAUSES

Man (Personnel)

HUMAN FACTORS

- Inadequate training on CNC-07 specific maintenance procedures
- Insufficient staffing levels during critical shifts
- Lack of adherence to preventive maintenance schedules
- Delayed reporting of minor machine anomalies

Scope: Human factors, skills, training, behavior

Machine

EQUIPMENT

- Electrical component failures (e.g., sensors, relays)
- Hydraulic system leaks and pump malfunctions
- CNC control software glitches and errors
- Mechanical wear and tear on moving parts (e.g., bearings, spindles)
- Inadequate cooling system performance leading to overheating

Scope: Equipment, tools, software, hardware

Material

RAW MATERIALS

- Inconsistent raw material quality affecting cutting tool wear
- Contamination of hydraulic fluid with debris
- Substandard replacement parts used during repairs

Scope: Raw materials, components, consumables

Method (Process)

WORK INSTRUCTIONS

- Lack of standardized troubleshooting procedures
- Ineffective preventive maintenance program
- Insufficient data logging and analysis of machine performance
- Absence of real-time monitoring system for critical parameters

Scope: Work instructions, SOPs, rules

Measurement

DATA

- Inaccurate sensors providing unreliable feedback
- Insufficient calibration of measuring instruments
- Lack of comprehensive data on downtime events
- Inadequate monitoring of hydraulic fluid pressure and temperature

Scope: Data, sensors, inspection, standards

Mother Nature

ENVIRONMENT

- Ambient temperature fluctuations affecting hydraulic fluid viscosity
- Humidity affecting electrical components

Scope: Environment, workspace, humidity, noise



Actionable Findings

Review your brainstormed items and use the target icon to select 1-2 key causes. These will be automatically carried forward to the countermeasure planning phase.



EFFECT / DEVIATION STATEMENT

SYNC CONTEXT

AI SUGGEST STATEMENT

Verified Root Causes

- Lack of adherence to preventive maintenance schedules
- Ineffective preventive maintenance program
- Insufficient data logging and analysis of machine performance

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6. Countermeasures & Plan

UPLOAD ATTACHMENT



Strategy Execution Board

STEP 6: COUNTERMEASURES & MILESTONES

AI SUGGEST PLAN

+ ADD ACTION

HIGH IMPACT NOT STARTED

Implement a computerized maintenance management system (CMMS) to automate PM scheduling and track adherence. Integrate CNC-07

Maintenance... 31/12/2024

TECHNI... NOT STARTED

HIGH IMPACT NOT STARTED

Conduct a comprehensive review and revision of the existing preventive maintenance program for CNC-07. This includes updating PM

Reliability En... 30/11/2024

PROCES... NOT STARTED

HIGH IMPACT NOT STARTED

Install advanced sensors and data logging equipment on CNC-07 to monitor key performance indicators (KPIs) such as vibration, temperature,

Automation E... 31/01/2025

TECHNI... NOT STARTED

MEDIUM IMPACT NOT STARTED

Establish a strict quality control process for incoming replacement parts, including verification of manufacturer certifications, material

Quality Assu... 31/10/2024

PROCES... NOT STARTED

MEDIUM IMPACT NOT STARTED

Provide comprehensive training to maintenance technicians on the revised preventive maintenance program, proper troubleshooting techniques,

Training Coor... 28/02/2025

TRAININ... NOT STARTED

MEDIUM IMPACT NOT STARTED

Develop and implement standardized work instructions (SWI) for all maintenance tasks on CNC-07. These SWIs should include detailed step-by-step

Maintenance... 31/12/2024

STANDA... NOT STARTED

Strategy Oversight
0 of 6 actions verified. Efficiency score: 0%.

RECALIBRATE STRATEGY

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7. Check Results (Monitor)

UPLOAD ATTACHMENT



Step 7: Verification of Results

Monitoring sustainment and quantifying final impact.

AI RESULT VERIFICATION

BASELINE

6.2

HOURS/WEEK

TARGET GOAL

2

HOURS/WEEK

ACTUAL FINAL

3,2

HOURS/WEEK

VARIANCE GAP

1.2

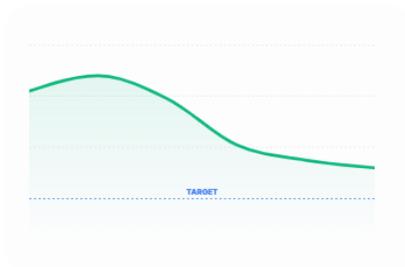
HOURS/WEEK



SUSTAINMENT MONITOR

POST-IMPLEMENTATION TREND

LOG DATA



23/09/20

6,8

30/09/20

5,9

07/10/20

4,1

14/10/20

3,5

21/10/20

3,2



IMPACT SUMMARY

BENEFITS (ANNUALIZED / RATE)

FINANCIAL GAIN

\$15,000 / year

Estimated annual savings of \$15,000 due to reduced

downtime and maintenance.

CAPACITY DELTA

Increase in production capacity...

Increase in production capacity by 4% due to

increased machine uptime.

RISK REDUCTION

Reduction in potential safety...

Reduction in potential safety incidents related to

countermeasures related to...

OUTCOME SUMMARY

The implementation of countermeasures resulted in a 3.2% reduction in unplanned downtime for CNC-07, exceeding the initial target of 3%. The

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8. Standardize & Share

UPLOAD ATTACHMENT



Step 8: Standardize & Share

Codifying success and scaling the solution across the enterprise.

AI SCALING STRATEGY



PROCEDURAL UPDATES

SOP & STANDARD WORK



CNC-07 Preventative Maintenance Checklist

CREATED - PUBLISHED



CMMS Data Entry SOP

CREATED - DRAFT



Predictive Maintenance Work Instruction

CREATED - PENDING



HORIZONTAL SCALING

YOKOTEN & BENCHMARKING



GH-M2 CNC Maintenance Team

WORKSHOP



Central Maintenance Engineering

WORKSHOP



CNC Maintenance Training Dept.

WORKSHOP



SUSTAINMENT LEAD

Maintenance Manager



CORE LESSONS LEARNED

CMMS data accuracy is critical for effective root cause analysis. Proactive predictive maintenance and improved parts quality significantly reduce unplanned downtime. Technician training on new maintenance procedures is essential for successful

UNVERIFY STEP

OTHER FUNCTIONS

Export reports

A3 **GH-M1 CNC-07 Unplanned Downtime Reduction**

STEPPER SPLIT VIEW REPORT EXPORT

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- A3 Canvas (Landscape PDF)
- Tech Dossier (Full Report)
- High-Res JPEG

Upload your files

Knowledge Base
Full history of evidence synced to gs://digital-a3.firebaseiostorage.app/user_uploads

Search artifacts or notes... All Evidence

ProblemDescription.txt
INVALID DATE • 0.4 KB
OBSERVER NOTES
No additional content provided.

A3Blank.png
INVALID DATE • 154.0 KB
AI INTELLIGENCE
"This image displays the initial "Problem Clarification" stage of an eight-step digital A3 reporting tool interface, featuring unpopulated fields for artifact uploads, AI..."
OBSERVER NOTES
No additional content provided.

Machine Learning with your data

ML Analytics Workbench
Predictive modeling for root cause quantification and pattern discovery. RESET WORKSPACE

Model Configuration SOIHOWS

1. SELECT TARGET PARAMETER (LABEL)
unplanned_downtime_min

This is the variable you want to predict or explain.

2. SELECT INPUT FEATURES

- shift
- ambient_temp_c
- coolant_pressure_bar
- spindle_vibration_mm_s
- tool_wear_pct

Run ML Analysis

RUN HISTORY CLEAR
12/01/2026, 19:28:07 • unplanned_downtime_min • 5 drivers Load Delete

MODEL ARCHITECTURE Regression

MODEL RELIABILITY
R-squared: ~0.70 (estimated, actual performance may vary)

Feature Importance Profile WEIGHTED IMPACT SCORE

| Feature | Weighted Impact Score |
|------------------------|-----------------------|
| shift | High |
| ambient_temp_c | Medium |
| coolant_pressure_bar | Medium |
| spindle_vibration_mm_s | Medium |
| tool_wear_pct | Medium |

Predictive Insights & Recommendations

The target variable 'unplanned_downtime_min' is continuous, suggesting a regression task. A linear regression model is appropriate given the moderate number of features and the need for interpretability. Feature importance is estimated based on the likely impact of each feature on downtime. 'Shift' is expected to have high importance due to differences in operational procedures and staffing. The other features are given relatively lower but significant scores. The accuracy estimate is based on an assumption of a moderately complex relationship between features and target.