SCRAP
REDUCTION
MODEL

Reduction of Scrap Through Predictive Model

Scrap Reduction Solution

Reduce excess scrap in your manufacturing process with a scrap prediction solution that allows operators to understand if machines will run within scrap targets.

INTRODUCTION

Manufacturing scrap is unusable material that is discarded from a manufacturing operation. Scrap can be divided into several categories while serving as a catch-all term for all rejected material. First, there is scrap that has been rejected as raw material. It could be due to spoilage, or it could be due to non-standard performance characteristics like tensile strength or shatter point. This material has not undergone any additional or partial processing.

The second type of scrap is partially processed scrap. Many manufactured goods are produced in stages of a manufacturing process, and failure at any stage can result in the part being rejected. Because the partially finished part has some value-added labour, it is more expensive than scrapping raw material.

Third, finished goods must be scrapped because they do not meet specifications. Some parts can be reworked by adding labour to adjust or transform them. Others may necessitate total scrapping if no rework can be performed.

> A decrease in scrap amount of about 6% will be able to increase material productivity by 0.05%.
>
> Source: IOP Sciences

> The global scrap availability will reach about 1 billion tonnes in 2030 and 1.3 billion tonnes in 2050.
>
> Source: World Steel Association

What Causes Scrap in Manufacturing?

Scrap can be caused by a range of factors and is often a result of poor processes. Typically, these processes inhibit maintenance, setup, tool quality, and training.

All scrap increases cost, and those that require added lab drive those costs up even more. In complex manufacturing environments, many factors cause scrap and rework, including:

Improper setup	Poor equipment maintenance
Poor tool maintenance	Poor tool quality
Operator error	Training issues
Manual processes	Communications errors
Inefficient procedures	Poor design change/specification management

COMMON CHALLENGES LEADING TO SCRAP GENERATION

Scrap varies greatly due to under performing shifts and operators

Brand Attribution models can be subject to correlation-based biases when analyzing the customer journey, causing it to look like one event causes another, when it may not have.

No standardized product specifications

Differences in the amount of scrap generated between lines and shifts could be attributed to differences in the manufacturing process's setup and scheduling. Product specifications must be defined in logical ways that account for the major sources of variation.

Outdated equipment

Older machinery for sinewave lines and T-shirt lines may generate more scrap than newer versions.

NEC'S AI-ENABLED SCRAP REDUCTION SOLUTION

NEC's artificial intelligence solutions for scrap reduction analyze historical and current plant data to provide comprehensive guidance to your production team. This step toward autonomous manufacturing enables your employees to eliminate defects and scrap while minimizing downtime without interrupting production or relying on the availability of external experts. Accelerated, AI-driven diagnoses of complex failures free up machine builders for value-add projects like product diversification.

SCRAP REDUCTION

NEC combines scrap reduction analytics with your production management experience to reduce scrap and material waste throughout your manufacturing process.

Analyze Data

Analyze live and historical production data along with process data to determine factors in your manufacturing process that typically result in high scrap rates or material waste.

Predict Scrap

Scrap prediction models are run against live production data to project scrap rates if operators continue with current process settings and output.

Alert Teams

Real-time alerts are generated if projected scrap rates exceed scrap targets so operators or supervisors can quickly act.

BENEFITS OF NEC'S SCRAP REDUCTION SOLUTION

ALLOW FOR A REAL-TIME VIEW OF SCRAP

Allow operators, supervisors, and engineers to understand the impact of decisions they make during the manufacturing process by providing a live view of scrap.

REDUCE SCRAP AND REWORK

Reduce scrap and rework by projecting scrap rates in real-time and adjusting processes across the manufacturing line.

REDUCE MATERIAL WASTE

Reduce material waste by reducing variability in manufacturing processes and encouraging material usage efficiency.

INCREASE YOUR PROFITS

Increase your bottom line by eliminating inefficiencies in your standard operating procedures (SOPs) and notifying operators when scrap rates reach unprofitable levels.

PREVENT OVERPRODUCTION

To reduce the amount of time spent producing defects, avoid overproduction by consistently hitting yield targets and quickly identifying high scrap rates.

HOW SCRAP REDUCTION SOLUTIONS WORK

ANALYZE HISTORICAL PRODUCTION DATA

Machine learning algorithms use data from CAD drawings, machines, and sensors, as well as quality systems, to create a digital thread of your manufacturing processes. Because these areas are typically measured differently and at different granularities, scrap is aligned with process data. Following that, data is formatted for consistency, organized into a taxonomy, and aligned with metadata such as product, shift, or quality state.

PROJECT SCRAP RATES IN REAL-TIME

Machine learning algorithms analyze real-time production data and perform real-time calculations to forecast a scrap of a run if operators continue production with the current process settings and output targets. Predictive scrap analytics can detect excessive material waste or quality failures before they occur, as well as highlight opportunities for improvement to improve efficiency and maximize the profitability of each production run.

NOTIFY TEAMS WITH PREDICTIVE ALERTS

When scrap predictions are trending outside of set targets, operators or shift supervisors are notified, minimizing human error. Engineers or shift supervisors can quickly identify the root cause of high projections and make real-time adjustments to eliminate scrap before rates rise to unprofitable levels.

CONTINUOUS LOOP OF PRODUCTION OPTIMIZATION

Even though processes, data, and bills of materials (BOM) change over time, predictive models must be updated to reflect these changes. Oden's patented platform automates the continuous evolution of such models, ensuring that projections and recommendations are always accurate with little lag time. A cloud-edge hybrid solution with a short iteration duration - the amount of time it takes to build, validate, and deploy new models - allows you to get the most out of your scrap reduction solution.

Why NEC?

NEC is a leader in the integration of IT and network technologies and brings more than 120 years of expertise in technological innovation to provide solutions for empowering people, businesses, and society. We possess deep expertise in the design and implementation of Scrap Reduction solutions for Manufacturing that leverage the most innovative AI and Big Data techniques including predictive modelling and machine learning (ML) reduce scrap, and energy costs, and improve prices & quotes for a sharper competitive edge.

Utilizing advanced AI, our Scrap Reduction Solution constantly evolves to help you eliminate the high cost of carrying extra inventory due to scrap/waste issues. This solution will help you in keeping production from getting backed up due to re-runs, ensure the correct parts are in place for a production run, saving costs, which affect the bottom line and profitability.

Capabilities on Technology Stack

Core business experience combined with domain and technical expertise with evolving tools and technologies.

Skilled Workforce

In-house business & domain experts

- Data Stewards
- Data Scientist
- Big Data Engineers
- Architects
- Consultants & Data Analysts

Domain Expertise

Solving Complex Data Challenges
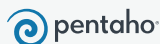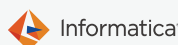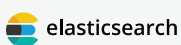Myriad of Successful Analytics Projects

Dedicated Analytics Research Labs
Work for Solutions for Societies

Robust Partner Ecosystem

Strong Partnership & Alliance Across Data Platforms & Analytics Solutions

Technology Partners

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elasticsearch · talend · Informatica · Greenplum · denodo · logstash · tableau

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