Feasibility Study of Implementing a Gauge Tracking system

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Aim of the Project

The Aim of the project is to design, build and test a gauge tracking system which tracks the gauge usage and location via a barcode system.

Background

A local precision engineering company Takumi Precision Engineering started a project to reduce machine downtime and improve production time in late 2023 which continued into early 2024.

Part of the issue leading to down time included operators having to go to the matrix to retrieve gauges as part of their setup. This can sometimes be futile as their co-workers may already have the gauge signed out. This leads to the operator looking for the gauge and chatting causing downtime.

As the matrix records usage on the gauge for recalibration purposes. The gauge must be signed in & out for each use.

My project aims to reduce downtime by using excel to track the usage of a gauge and prompt both the operator and a quality rep. to recalibrate the gauge.

This means that gauges no longer have to go back to the matrix for usage recording & each cell can have their own set of most commonly used gauges. Meaning only uncommon gauges must be got from the matrix.

Barcode History

A barcode is a series of parallel lines, dot matrix or small squares these are all typically black printed on a white background. Barcodes are used to get either numerical or Alfa-numerical data easily and quickly.

The first patent for a barcode was filed in 1949 by Joe Woodland and Bernard Silver, which was later granted in 1952. This barcode was similar to a bulls eye as this was thought to be the only way to read it from angle.

Although the first patent was filled for in 1949 the barcode was not usable until 1974 when the technology to read it was developed by International Business Machines.
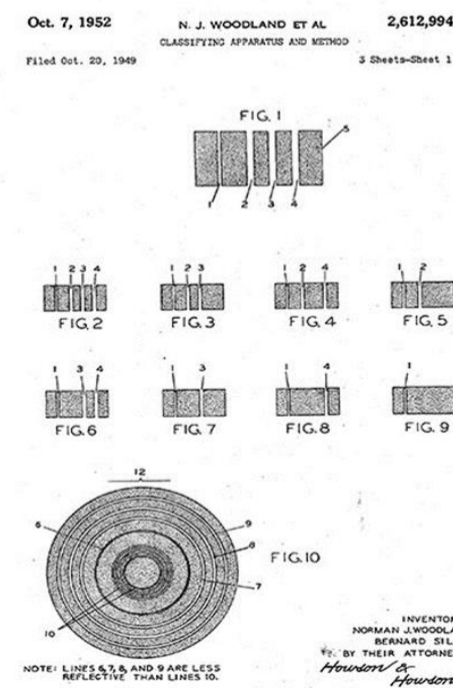
There are two main types of barcodes 1D which are one dimensional and are typically found on consumer products. 1D barcodes consist of vertical lines typically black on a white background

Barcodes

2D which are have two dimensions and are typically used as URL links or high data applications. 2D barcodes consist of both vertical & horizontal lines typically black on a white background an example of these is a QR code.

Solution

Microsoft Excel & Excel Visual Basic for Applications (VBA) was used to develop a tracking system which records the usage on a gauge, warn the operator when getting within 250 uses of the max limit and to tell the operator that the gauge is out of calibration when it reaches the limit set. This will also trigger an email to be sent to quality for the gauge to be recalibrated.
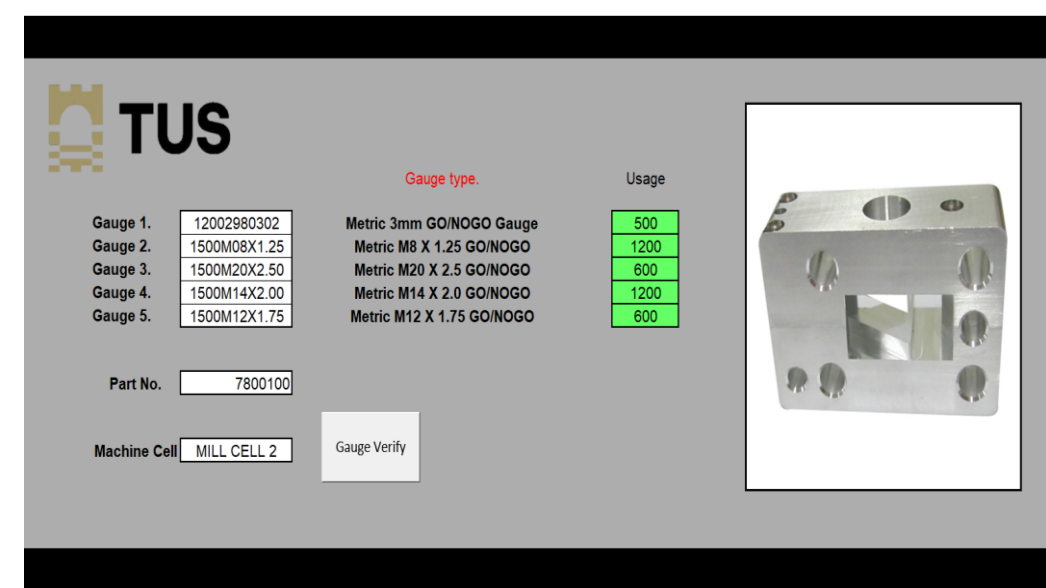
Excel & VBA

A user interface which is intended for operator usage was developed which allows an operator to select up to 5 gauges at one time check their current usage, scan the part number and ensure its correct and then apply the usage to the gauges selected

Gauge Type	Gauge Number	Description	Current Gauge Usage	LOW USAGE WARNING	MAX Usage
METRIC GO/NOGO PIN GAUGES	12000980102	Metric 1mm GO/NOGO Gauge	1400	1750	2000
	12001980202	Metric 2mm GO/NOGO Gauge	300	1750	2000
	12002980302	Metric 3mm GO/NOGO Gauge	500	1750	2000
	12003980402	Metric 4mm GO/NOGO Gauge	1400	1750	2000
	12004980502	Metric 5mm GO/NOGO Gauge	300	1750	2000
	12005980602	Metric 6mm GO/NOGO Gauge	1875	1750	2000
	12006980702	Metric 7mm GO/NOGO Gauge	700	1750	2000
	12007980802	Metric 8mm GO/NOGO Gauge	400	1750	2000
	12008980902	Metric 9mm GO/NOGO Gauge	625	1750	2000
	12009981002	Metric 10mm GO/NOGO Gauge	2050	1750	2000
	12010981102	Metric 11mm GO/NOGO Gauge	700	1750	2000
	12011981202	Metric 12mm GO/NOGO Gauge	300	1750	2000
METRIC THREAD GO/NOGO GAUGES	1500M04X0.70	Metric M4 X 0.7 GO/NOGO	0	1250	1500
	1500M05X0.80	Metric M5 X 0.8 GO/NOGO	1325	1250	1500
	1500M06X1.00	Metric M6 X 1.0 GO/NOGO	1050	1250	1500
	1500M08X1.25	Metric M8 X 1.25 GO/NOGO	1200	1250	1500
	1500M10X1.50	Metric M10 X 1.5 GO/NOGO	1675	1250	1500
	1500M12X1.75	Metric M12 X 1.75 GO/NOGO	600	1250	1500
	1500M14X2.00	Metric M14 X 2.0 GO/NOGO	1200	1250	1500
	1500M16X2.00	Metric M16 X 2.0 GO/NOGO	775	1250	1500
	1500M18X2.50	Metric M18 X 2.5 GO/NOGO	0	1250	1500
	1500M20X2.50	Metric M20 X 2.5 GO/NOGO	600	1250	1500

A gauge database was developed which tracks the usage of all gauges within the factory & can only be reset by a quality rep using a password.

Acknowledgements