Implementation of a 3D Kaizen scanner inside Golde Oradea

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Introduction

Following a Kaizen implementation within the company, one of the aspects on which it was decided to intervene is the optimization of the time for the dimensional analysis based on the measurements performed at CMM.

Given the large number of components that need preliminary measurements for their inspection together with the large number of assemblies that require CMM measurements to validate the production, it was decided to purchase a 3D scanner.

After performing some tests, it was observed that the time required to generate a preliminary dimensional report is about 50% shorter using the 3D scanner compared to the use of the CMM.

Acquisition indicators

It was decided to purchase a 3D scanner, for this acquisition the following indicators were taken into account:

- Scanning accuracy
- Mobility
- Additional equipment and accessories required for the scanning process
- Price

For this decision, 3 different models were analyzed in order to finally choose the best offer that meets to the greatest extent each of the indicators presented above, so the scanner chosen was Creaform HandySCAN BLACK Elite.

Figure 1. Creaform HandySCAN BLACK Elite

Working method

The way to use the scanner optimally to get the best performance is as follows:

1. Creating the measurement program in the dedicated software (PolyWorks)
2. Scanning parts, creating the Mesh
3. Clearing unwanted information from the scanned model (scanned areas irrelevant to the dimensional ratio)
4. Import of the Mesh in PolyeWorks
5. Running the measurement program
6. Generating the dimensional report

The procedure for generating the dimensional report and the color map

1. Importing the CAD model into Poly Works

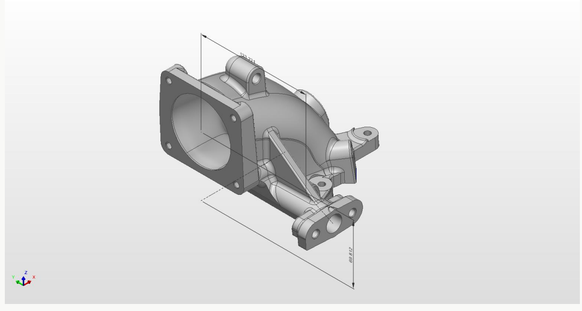


Figure 2. CAD Model

2. Mesh importing

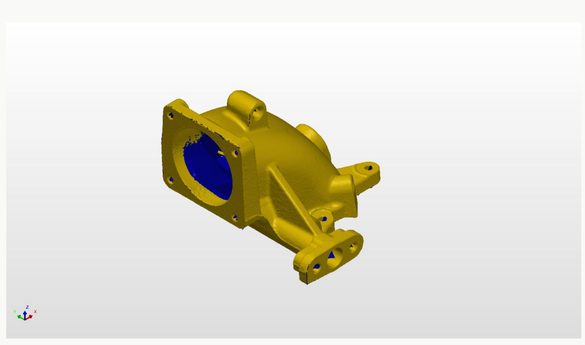


Figure 3. The Mesh

3. Mesh alignment with CAD model

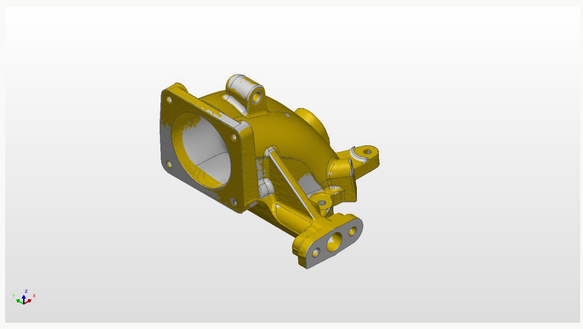


Figure 3. Align Mesh-CAD

4. Generating the color of the mao for the preliminary analysis of the landmark

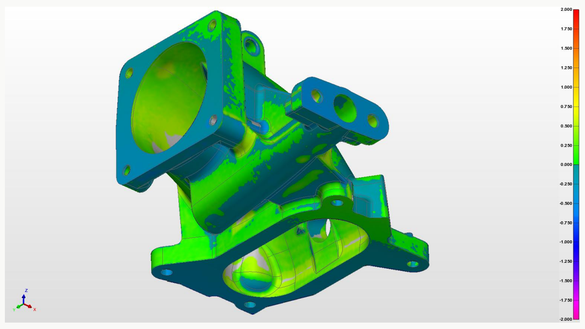
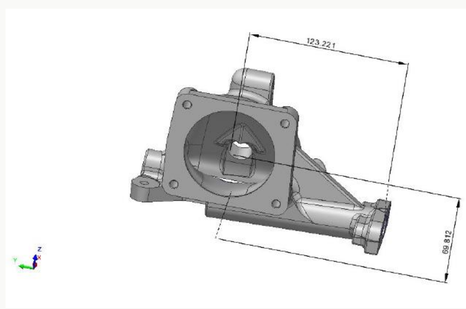


Figure 4. Colour Map

5. Running the measurement program



Control View

Control View Name	distance
Units	Millimeters
Coordinate Systems	world
Data Alignments	best-fit to ref 1
All Statistics	Total: 2, Measured: 2 (100.000%), Pass: 1 (50.000%), Fail: 1 (50.000%), Warning: 0 (0.000%)

Char No.	Object Name	Control	Nom	Meas	Tol	Dev	Test	Out Tol
	distance 1	Z Distance	69.985	69.812	±0.250	-0.173	Pass	
	distance 3	Y Distance	123.800	123.221	±0.250	-0.579	Fail	-0.329

Figure 5. Dimensional report

Economic analysis

Costuri/Metoda	CMM	3D Scanner	CMM+3D Scanner
Medie repere masurate in 8h.	20	30	40
Timp mediu per reper(min)	24	12	16
Cost utilizare echipament (eur/min)	€ 1,00	€ 0,50	€ 1,50
Cost operator utilizare (eur/min)	€ 1,00	€ 1,00	€ 1,00
Cost total (eur/zi)	€ 960,00	€ 720,00	€ 1.200,00
Investitie	€ 160.000,00	€ 70.000,00	€ 230.000,00
Amortizare investitie (eur/zi)	€ 480,00	€ 240,00	720
Timp de amortizare (zile)	333	292	319
Numar total de repere in perioada de amortizare	6667	8750	12778
Costuri totale pe durata unui an	€ 243.840,00	€ 182.880,00	€ 304.800,00
Numar total de repere pe durata unui an	5080	7620	10160
Cost per reper (eur)	€ 48,00	€ 24,00	€ 30,00
Cresterea volumului de piese scanate utilizand in paralel cele 2 echipamente fata de unul singur (nr.repere)	5080	2540	-
	200%	133%	

Table 1. Financial data

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