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Application of 3D Scanner in Restraint System Components

JOYSON SAFETY SYSTEMS

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Company Profile

Organisation Name : Joyson Safety Systems Pvt. Ltd.

Location : Plot No 20, Sector 5, IMT Manesar,
Gurugram, Haryana 122050

Head office : Sterling Heights, Michigan, United States.

Products : Airbag systems, Seat belts, Steering wheels.

Organisational Products

- Our products are safety related which helps occupant in an accident.

Airbag

Steering wheel

Seat belt

Organisational Product (Child Parts), Contd.

- Our majority of child parts are made with plastic material.
- We need 3D Scanning of component for the proper fitment in assembly.

Plastic parts


Mech Cover


Lever


Sash Guide


Cradle


Ejector


Boot


Tong Plate


Lower Cover


Push button


Cover Upper


Pawl

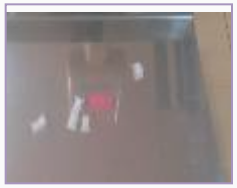

Ratchet


Spring Plate


Spring Cover


Lach


Tong stopper cap


Cantiliver


Tong stopper


Cover sash guide

Metal parts


Inertia Disc


Spool


Bush


Frame - Webbing


Lock Bar


Spring


Frame


Anchor

Testing Facility in R&D Centre

- Testing facility supports to evaluate the performance of our restraint products.

Servo Sled Lab

Dummy Lab

Metrology Lab

Airbag Deployment Lab

Environmental & Vibration Lab

Physical Lab

Measuring Environment of 3D Scanner

- 3D scanners are tri-dimensional measurement devices used to capture real-world objects or environments so that they can be remodeled or analyzed in the digital world.

Blue Light Triple Scanner (GOM Make)

Triple Scan Technology

- 3 sensors in 1 system.
- Camera captures 3D scan from left and right camera.
- Left and right views can be seen together which helps us for aperture and focal length adjustment point of view.
- Linear motion unit is very helpful for automation point of view.
- User friendly joy stick is available for rotational angular movement.

Work Flow of 3D Scanning Process for plastic parts

- Process of creating a 3D digital models from physical objects or environments.

Set-up for Scanning Process

Geometrical Entities

CAD

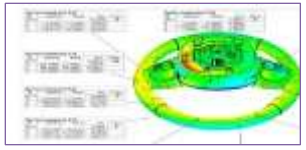
REVERSE ENGINEERING

Part

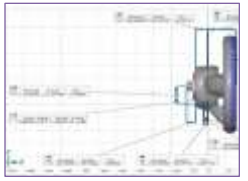
3D Scanner

Scan

INSPECTION



3D Comparison



2D Measurement

Measuring Result on VMM for Plastic Parts

- Traditionally, vision measuring machine are used to acquire and analyze two-dimensional (2D) images of manufactured products.

Vision measuring machine

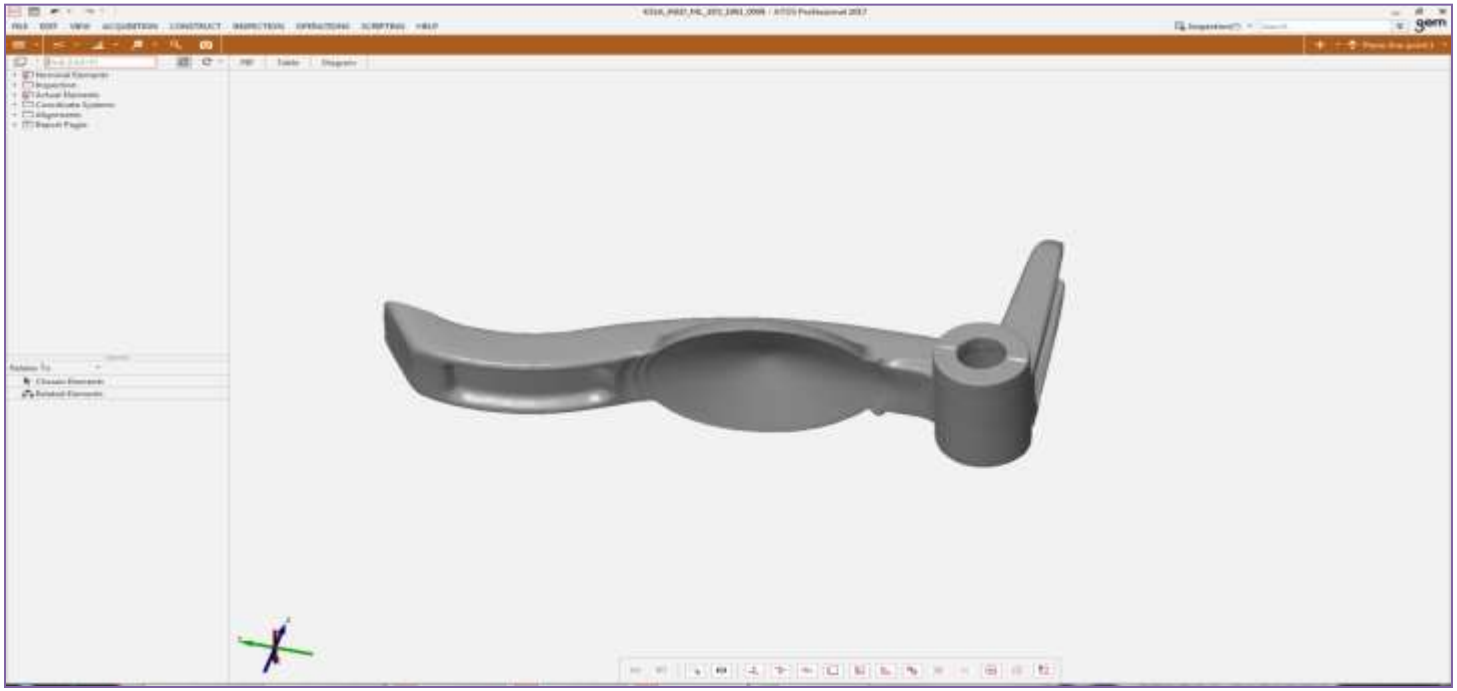
Joy stick

- In vision measuring machine we have to fix our part on v block or fixture and after that we have to alien our part in x, y coordinate with the help of the joystick we can adjust our camera position and afterwards with the help of the software we can get 2D dimensional data.

Measuring Result on 3D Scanner of Plastic Parts (Lever)

- With the help of 3D scanner we get scan data or the actual data as shown in below figure.

- Lever is child part of retractor which is plastic made.
- Its scanning is required for dimensional and GD&T inspection.

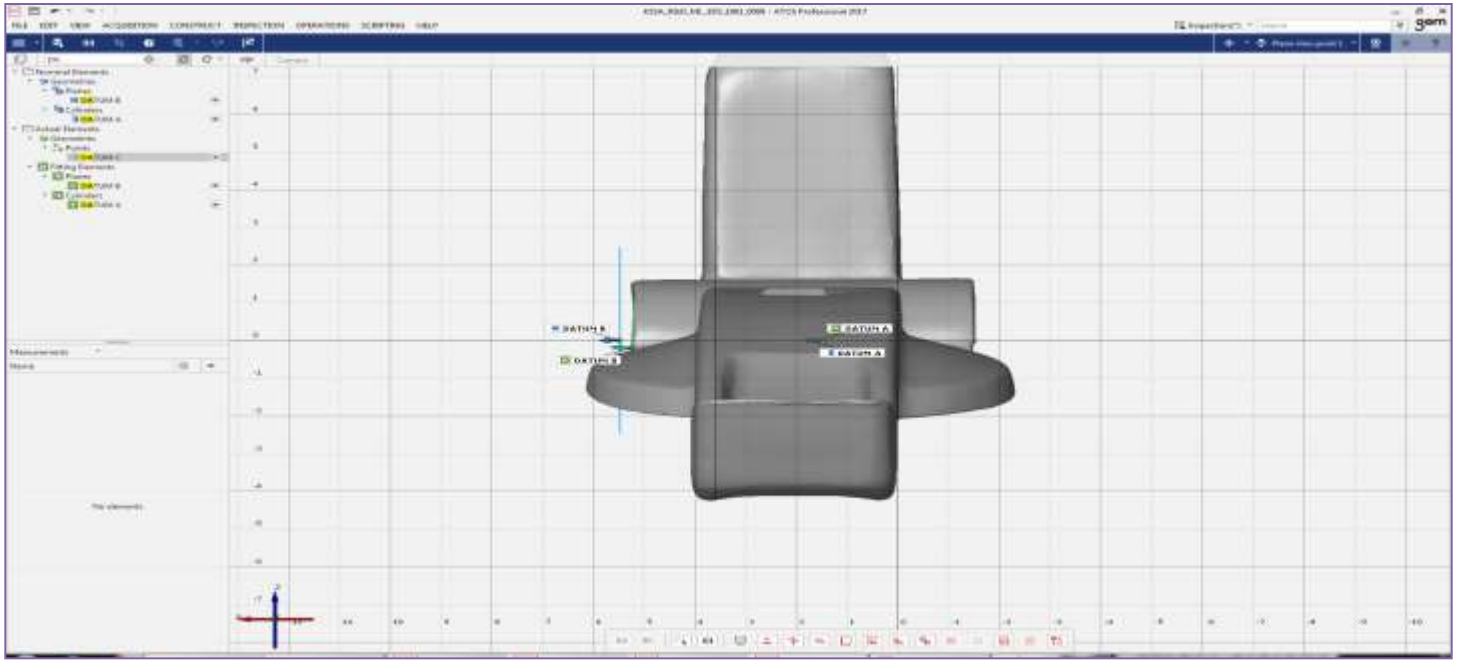


Scanned data of lever(Retractor child part)

Measuring Result (Component Alignment)

- Here we are Align the actual data with cad data with the help of geometric identities .

- ATOS is used to align scanned part with the help of geometric identities.
- Alignment is needed to compare the scanned data with CAD data.
- Pre alignment options are also available with ATOS which save time in case of regular geometric component.

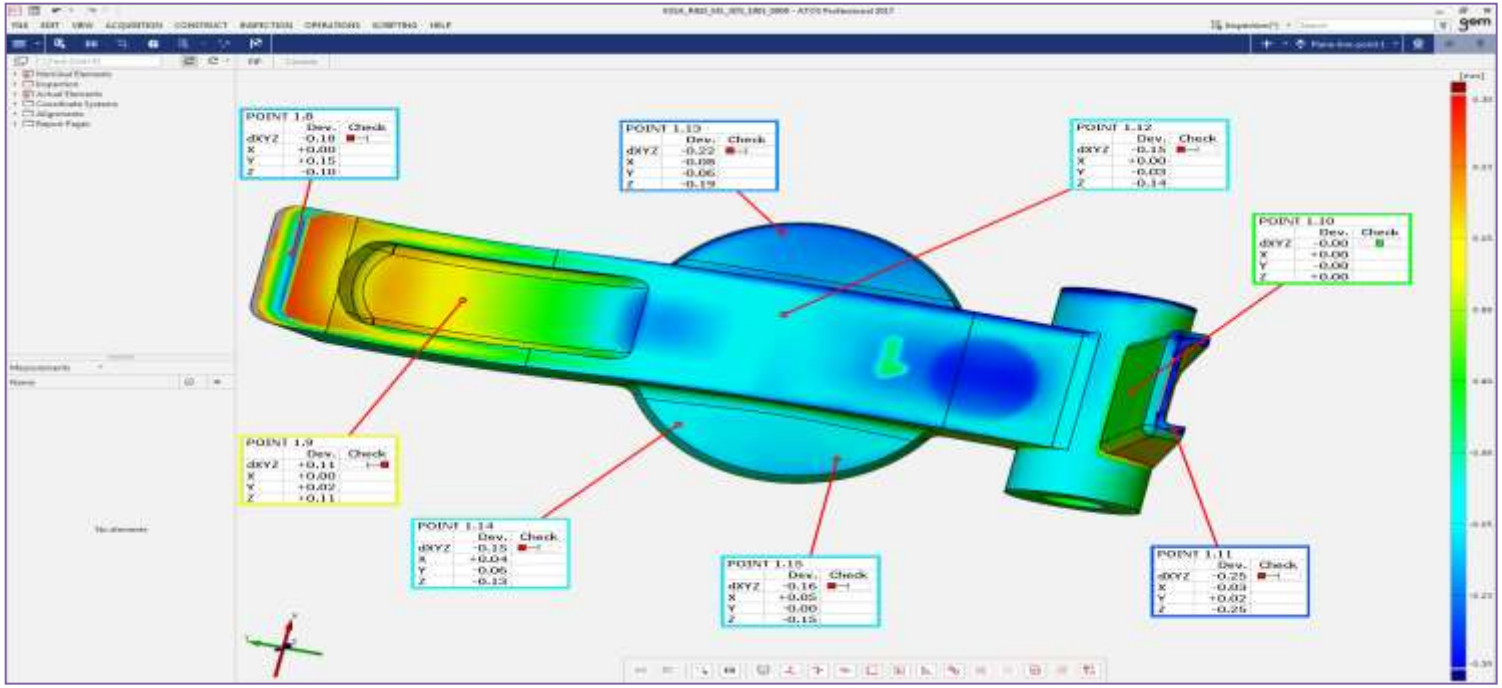


Align data of lever(Retractor child part)

Measuring Result (Surface Comparison)

- Using the right 3D scanner, inspectors can quickly determine whether a supplier's part meets its specifications, without having to do a complete part layout.

- With the help of ATOS we can do surface comparison of actual part with cad data We can check surface comparison at each and every point on the part

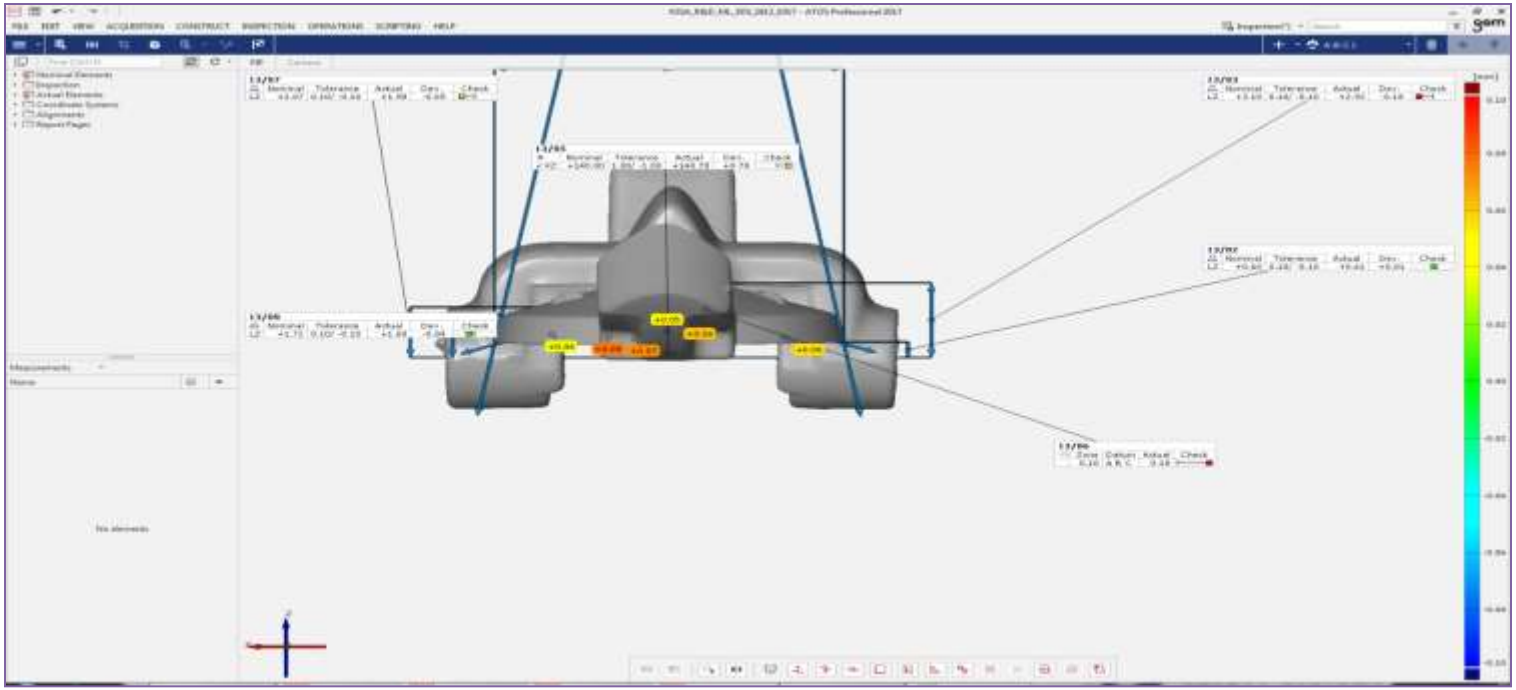


Surface comparison of Lever (Retractor child part)

Measuring Result (Component Inspection)

- Use friendly GUI in ATOS system, which helps work easily.

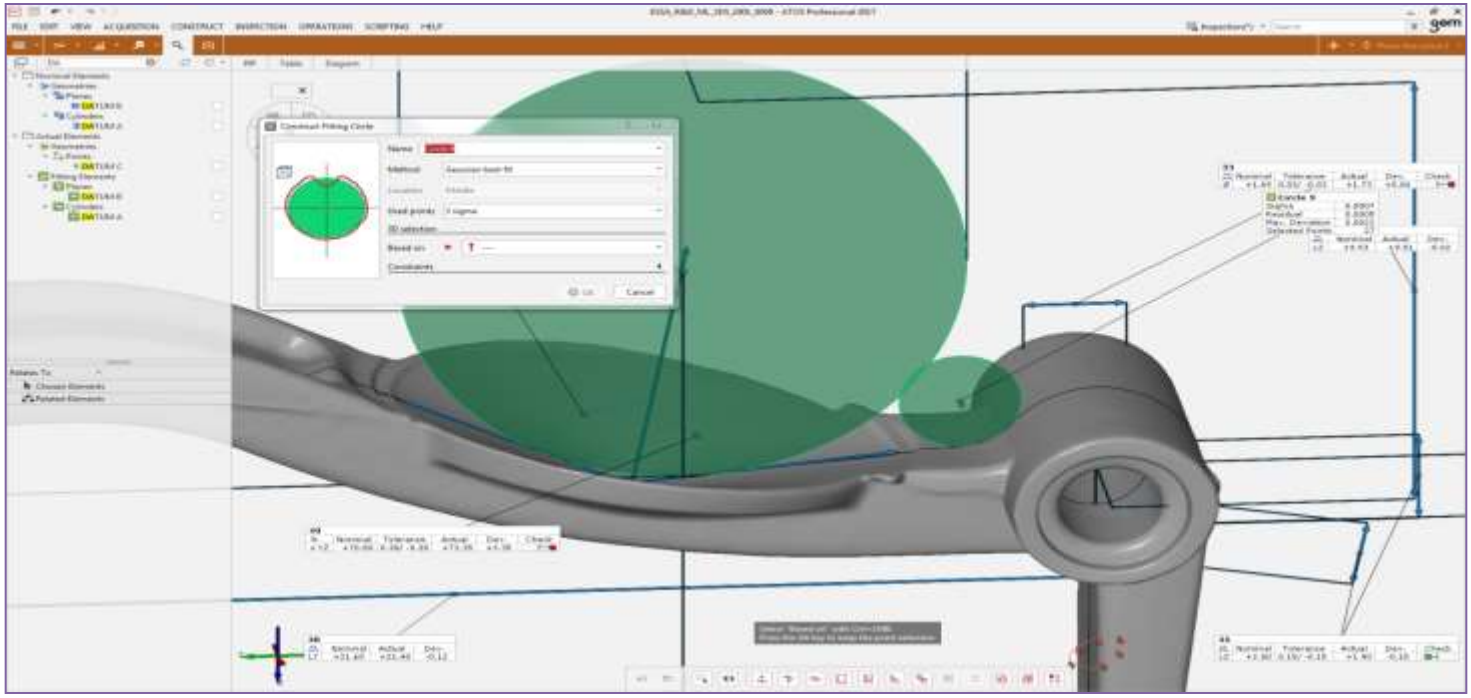
- It can automatically identify individual features in a 3D scan, filter the data intelligently to remove unwanted data and take reliable, accurate measurements.
- This will speed up your inspections and enable you to measure GD&T on your scanned parts too.



3D inspection of lever

Measuring Result (Component Inspection), Contd..

- Create graphically rich inspection reports and 3D color maps and GD&T .



3D inspection of lever

VMM and 3D Scanner Comparison

- 3D Scanner is useful for all GD & T analysis with better accuracy and less time consumption.

vmm

3D scanner

1. Traditionally, vision measuring machine are used to acquire and analyze two-dimensional (2D) images of manufactured products.	1. 3D scanning is particularly effective for quality inspection of parts that have complex shapes, compound curves and multiple features.
2. In VMM we can not measure GD&T feature For example profile of a surface, flatness of a surface ….	2. With the help of 3D scanner we can find GD&T feature For example profile of a surface.
3. In VMM alignment is done by manually by changing the position of the specimen.	3. In 3D scanner alignment is done by geometry Identities without changing position of the specimen.
4. Surface comparison with cad data is not possible on VMM.	4. Surface comparison with cad data is also possible in 3D scanner.
5. We have to insert data in excel sheet to get the report.	5. Here we get software generated report and we can change report format too.
6. Inspection and verification time four days .	6. Inspection and verification time two days.
7.Mold correction frequency three times.	7. Mold correction frequency two times.

Advantages of using 3 D Scanner

- Application of 3D Scanner can improve the quality and save the time in automobile industry .

S.NO	Parameters	Description
1.	Very fast scan times	as fast as 1 second per shoot.
2.	Large scanning area	as large as 48 inches in a single scan.
3.	High resolution	as high as 16 million points per scan and 16 micron (.00062”) point spacing.
4.	Very high accuracy	as high as 10 microns (.00039”).
5.	Versatile	multiple lenses to scan small to large parts in a single system.
6.	Portable	hand held systems are very portable.

Conclusion

- 3D Scanner is useful for GD&T analysis of plastics components in automobile industry.
- It can be used for reverse engineering also.
- Accurate result can be achieved with the help of 3D Scanner.

"Measurement is the first step that leads to control and eventually to improvement. If you can't measure something, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't improve it."

Thank You!!