

## Tokai Rika Co., Ltd.

## **Revolutionizing Production Preparation** with 3D Utilization

Tokai Rika Co., Ltd. is actively pursuing operational reforms in production preparation by leveraging 3D data under the banner of "DXed Machikoba (small factories) " (Digitally Transformed Machikoba).

This article introduces specific examples of Fujitsu Digital Manufacturing FJVPS (hereinafter referred to as VPS) that use VPS solutions, such as "3D layout consideration using FJGP4D," "1/1 verification using Xphere," and "centralization of document information using FJVPS MFG."

This case study is based on the presentation given at the 38th VPS Case Study Seminar.



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### Deployment case study key word

Design Product	Various automotive switches, key locks, seat belts, shift levers, electronics application products, steering wheels, connectors, mirrors, plastic wheel covers, ornaments	
Solution	Fujitsu's Manufacturing Solutions	Manufacturing Solutions Page
Product	FJVPS, FJGP4D, Xphere	Product's page

## **Background of the Initiative**

Previously, DR (design review) process was conducted while looking at 2D layout illustrations and hand-drawn rough sketches, but the contents of the study were not fully conveyed, and suggestions were often overlooked, resulting in problems becoming apparent after the equipment was delivered, resulting in rework and additional costs. In order to solve this problem, VPS GP4 was introduced as a solution that enables the participants of DR to share a common image in 3D, confirm the contents, and propose improvements.

As the use of VPS GP4 continues, VPS MFG and VPS Xphere are introduced to further reduce the man-hours required for production preparation work.

## 3D Layout Review using FJGP4D

Previously, production lines were made of cardboard and workability and layout feasibility were reviewed. However, creating a cardboard line took time and space. Tokai Rika therefore began using VPS GP4 to reduce excess space on assembly lines and improve workability. As a result, they succeeded in making the line more compact and reducing walking distance by 50% (Figure 1).

## FJGP4D Production Process Simulation (Initiative Details)

Reducing Excess Space in Assembly Lines ⇒ Shortened the walking path (3m 50% reduction)

Line Space Reduction (6 m<sup>2</sup> reduction)





After-Improvement

Walking path: 6.0m Line size: 5.0x4.0 (m)

Walking path: 3.0m Line size: 4.0x3.5 (m)

Since it can be checked in 3D, excess space can be eliminated, and line space can be reduced.

Figure 1: Assembly Line Review

(Source: 38th VPS Case Study Seminar Presentation Materials)

Additionally, we worked on reducing work-related stress. Here, we utilized the posture evaluation feature of VPS GP4, which is tailored to Tokai Rica's internal standards. Previously, layout reviews relied on intuitions, but the work evaluation feature enables to place equipment in an efficient position to minimize physical stress and maximize efficiency inline with quantitative standards.(Figure 2&3).

#### **FJGP4D Posture Evaluation**



Figure 2: Work Evaluation Value Table



Each task can be evaluated quantitatively through work posture evaluation Now, equipment can be placed in optimal locations, not just based on feel

Figure 3: Utilization of Posture Evaluation (Source: 38th VPS Case Study Seminar Presentation Materials)

## 1/1 Verification with Xphere

In addition to using VPS GP4, Tokai Rika employs VPS Xphere to help production line personnel gain a deeper understanding of the line review content. By leveraging the GP4 integration feature of VPS Xphere, they can virtually enter the assembly line in VR. This immersive experience allows for evaluations that are closer to actual operations compared to viewing on a 3D screen, enabling identification of more potential issues. By optimizing part retrieval locations and reducing unnecessary movement ("mountain climbing" over equipment), significant reductions in overall operator movement distance have been achieved (Figure 4).

The combined use of VPS GP4 and VPS Xphere during the trial phase resulted in a 10% reduction in overall man-hours compared to conventional methods. Even greater efficiency gains are anticipated with the full integration of these solutions into standard operating procedures.

#### 1/1 Verification with On-Site Collaboration



With the 1/1 experience, problems that were not noticed on the GP4 were identified.

VR (Xphere) Review



The issues incorporated into the GP4 layout which were identified in the VR environment . This process led to a reduction in manual movement distances and minimized vertical movements.

Figure 4: Utilization of Posture Evaluation (Source: 38th VPS Case Study Seminar Presentation Materials)

# Centralization of form information by FJVPS MFG

In the preparation of various forms, such as process review documents and process FMEAs, significant time was spent on returning work, checking for omissions, and copying duplicate information. To address this, FJVPS MFG is used to centralize this information. The first step involves standardizing the format of forms that differ between plants. Information on unified forms across plants is defined using the tabular function in FJVPS MFG . In line with the standardization of formats, the standardized items are registered in the Tabular Library of the Tabular Feature. This allows for the creation of various forms by selecting the required information from the Tabular Library according to the item, thereby unifying different wordings for each form.

Moving forward, the promotion team will manage the library and add items as Required. During the trial phase, this effort resulted in a 20% reduction in time spent (Figure 5&6).



Figure 5: Efforts to reduce the time required to create forms

(Source: 38th VPS Case Study Seminar Presentation Materials)

## **Company Profile**

## TOKAI RIKA CO., LTD.

Head office: 3-chome 260, Toyota, Oguchi, Niwa District, Aichi, Japan

Foundation: August 1948

**Business:** Various automotive switches, key locks, seat belts, shift levers, electronics application products, steering wheels, connectors, mirrors, plastic wheel covers, ornaments

Capital: 22.8 billion Japanese yen

No. of Employees: 20,083 (consolidated)

Home page : https://www.tokai-rika.co.jp/en/

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Figure 6: Efforts to reduce the time required to create forms

(Source: 38th VPS Case Study Seminar Presentation Materials)

## **Future Developments**

Tokai Rika is considering to deploy VPS MFG/GP4/Xphere in other departments and its application to new products, and is working to further reform operations using 3D data.

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