FJVPS Deployment Case Study

FUJITSU

PHC Holdings Co., Ltd.

Two Forms of VPS Implementation

- Demand-driven and Proposal-driven, 2 types of Deployment -

In the process of advancing concurrent engineering and front-loading, PHC Holdings Co., Ltd. has implemented Fujitsu Digital Manufacturing FJVPS (hereinafter referred to as VPS) as a tool to address challenges. There are two types of implementation: "Demand-driven," where VPS is introduced based on requests from the field, and "Proposal-driven," where VPS is proposed as a solution for concurrent engineering.
Mr. Izumi Ito, from the Manufacturing Promotion Management Department, Manufacturing Planning Section, will introduce specific case studies of the progress and effects of these two types of VPS implementation.

Manufacturing Promotion
Management Department
Manufacturing Planning Section:
Mr. Izumi Ito

Life Sciences
Research and Medical Support Equipment

Deployment case study key word

Design Product	Medical equipment	
Solution	Fujitsu's Manufacturing Solutions	Manufacturing Solutions Page
Product	FJVPS	Product's page

Demand-driven VPS Implementation (Implementation at Factory A)

~Strengthening communication between the design department and other departments through VDR and VMR~

While each department focused on individual optimization, inter-departmental communication remained outdated. To address this, VDR(Virtual Design Review) and VMR(Virtual Manufacturing Review) using VPS were introduced to enhance feedback efficiency to design teams and facilitate smoother collaboration with manufacturing.
In VDR, data is analysed before prototyping to identify potential issues and concerns. By addressing correctable issues prior to physical prototyping and conducting design reviews during the prototyping phase, overall quality can be improved. Additionally, involving multiple stakeholders in this process can generate more ideas and insights, leading to a more refined final product.

In VMR, assembly processes are repeatedly validated in a virtual space, allowing for the pre-emptive consideration of process flow, tooling, and equipment. The system was designed with the concept of creating work instructions in advance, starting with tasks that can be initiated early.

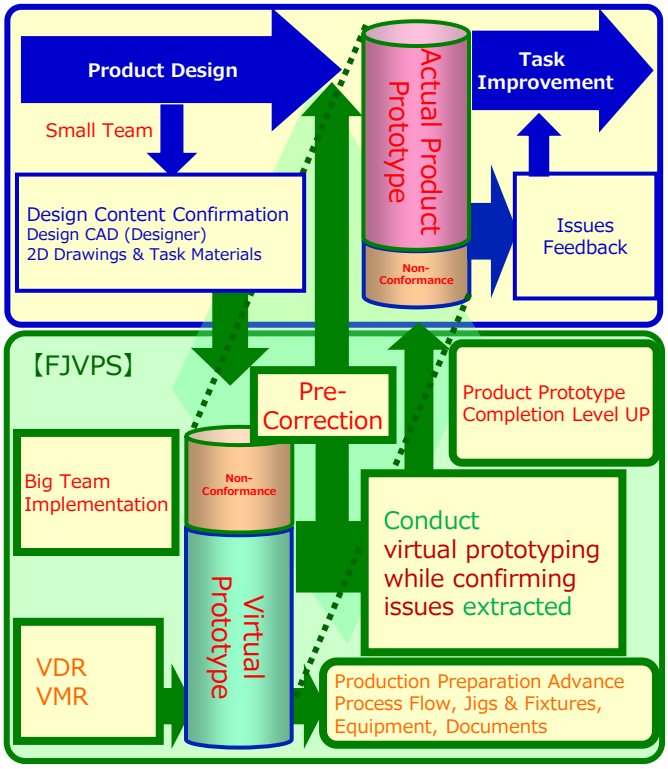


Figure 1: How to Deploy VPS

First, a VPS team made up of members of this department creates a work instruction document by actually conducting VDR/VMR using VPS based on design information. In order to utilize this data, an environment has been created in which data can be shared with the VDR Specialist Department. By eliminating the barriers between each department and sharing information, we made it easier to gather knowledge and ideas prior to trial production. By implementing this system for each prototype, requests and issues were improved, and were able to further improve the degree of design completion by gathering knowledge from various fields.

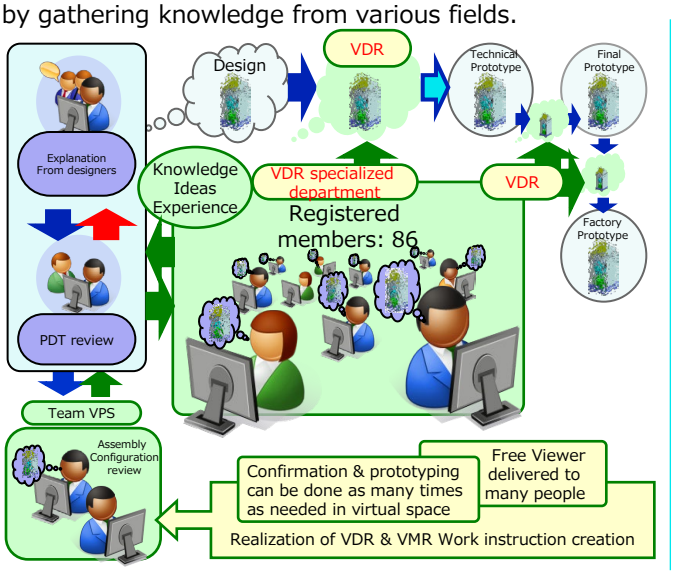
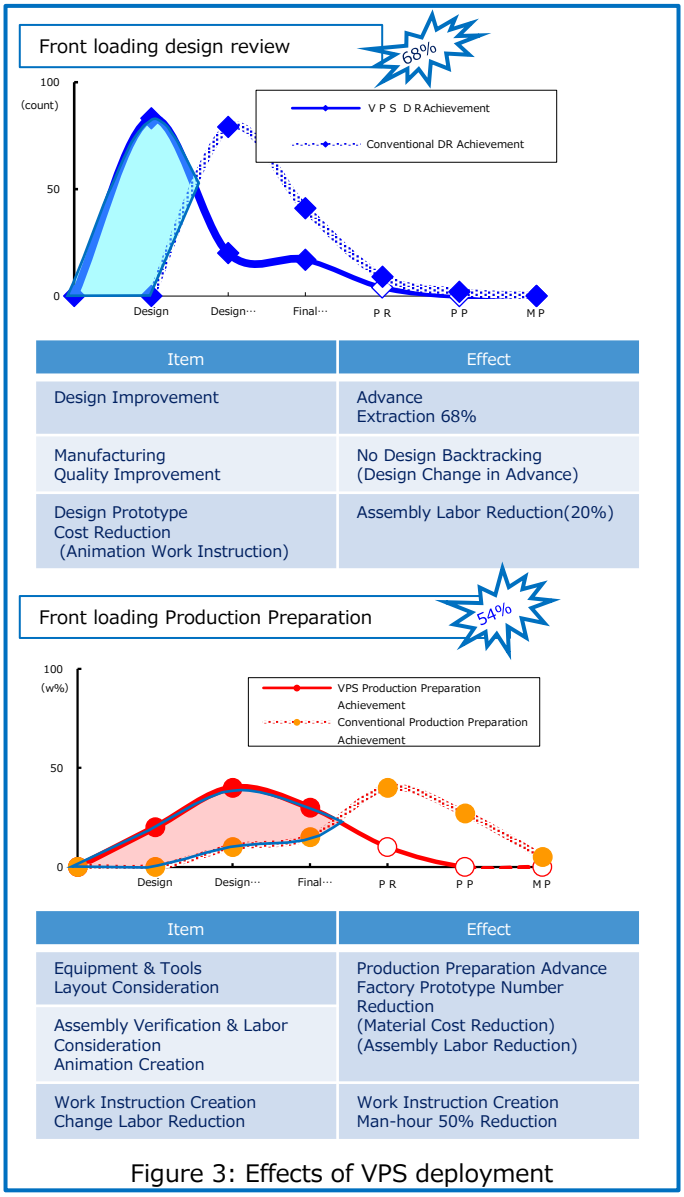


Figure 2: Deployment of VDR and VMR

The deployment has resulted in improved prototype quality, reduced man-hours for prototype assembly, accelerated production preparation, and reduced man-hours required to prepare work instructions.



Item	Effect
Design Improvement	Advance Extraction 68%
Manufacturing Quality Improvement	No Design Backtracking (Design Change in Advance)
Design Prototype Cost Reduction (Animation Work Instruction)	Assembly Labor Reduction(20%)

Item	Effect
Equipment & Tools Layout Consideration	Production Preparation Advance Factory Prototype Number Reduction (Material Cost Reduction) (Assembly Labor Reduction)
Assembly Verification & Labor Consideration Animation Creation	
Work Instruction Creation Change Labor Reduction	Work Instruction Creation Man-hour 50% Reduction

Figure 3: Effects of VPS deployment

Proposal-Based VPS Deployment (Initiatives at Factory B)

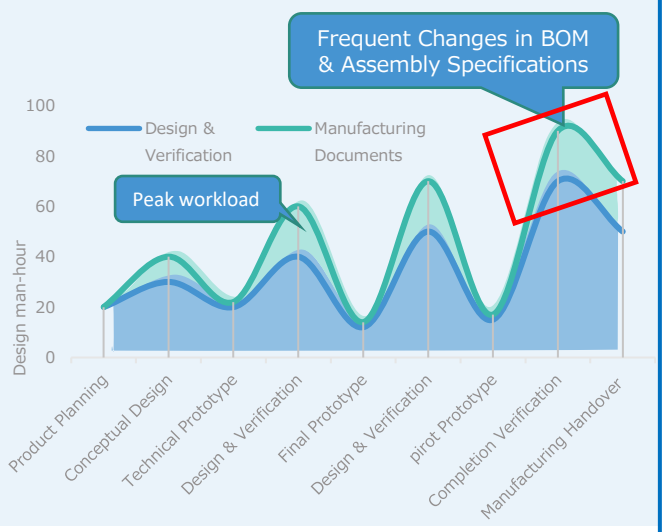
～Concurrent engineering significantly reduces the workload of designers～

The system was deployed in the design department, and the key to its implementation was concurrent engineering. The proposal was to improve the areas where designers' work was concentrated, which affected the development lead times.

The background to the issue was that for products designed in Japan and manufactured overseas, the manufacturing division produced some of the prototypes, and while the BOM and simple assembly specifications were required for prototypes, the burden of creating prototype materials was high.

The consistency between the BOM and assembly specifications was put off, resulting in a concentration of specification changes.

Trend of Design Man-hours in Product Development



Features of the deployed and Verified Product
- Domestic Design → Overseas Production (PHC Indonesia)

Features of the Proposed Product Development
- Manufacturing department produces some parts from the prototype stage
- BOM and simple assembly specifications are required during prototyping

Issues
- Creating prototype materials is burdensome
- Consistency between BOM and assembly specifications is an afterthought, resulting in concentrated specification change

Figure 4: Background of the Proposal

To solve the problem, we implemented a three-pronged approach: introduction of comprehensive verification of the VPS, introduction of reference numbers for new rules, and introduction of a new form of assembly specifications.

Comprehensive verification was performed at each development step (demonstrated by Ito-san) to align images with the designer several times. The 3D and assembly specification data were then passed to the manufacturing department prior to prototyping, making it part of the data used for prototyping in manufacturing. The reference numbers linked in a parent-child relationship, were used to identify the location of parts, maintain consistency between the BOM, specifications, and 3D data. As long as there was a reference number, even without a part number or name, conversations between design and production could be established, consequently resolving the issue.

The accuracy of BOM registration to PDM was improved by using an EXCEL macro to perform 3-point matching on the assembly specification sheet.

Comprehensive verification (Global Target Simulation)

From the stage of high abstraction (planning and conceptual design), in parallel with design, virtual prototyping is conducted from the part drawings that have been created, and a shallow and broad verification covering the entire product is conducted to improve the degree of completion before prototyping by checking step by step and then confirming the results with prototyping.

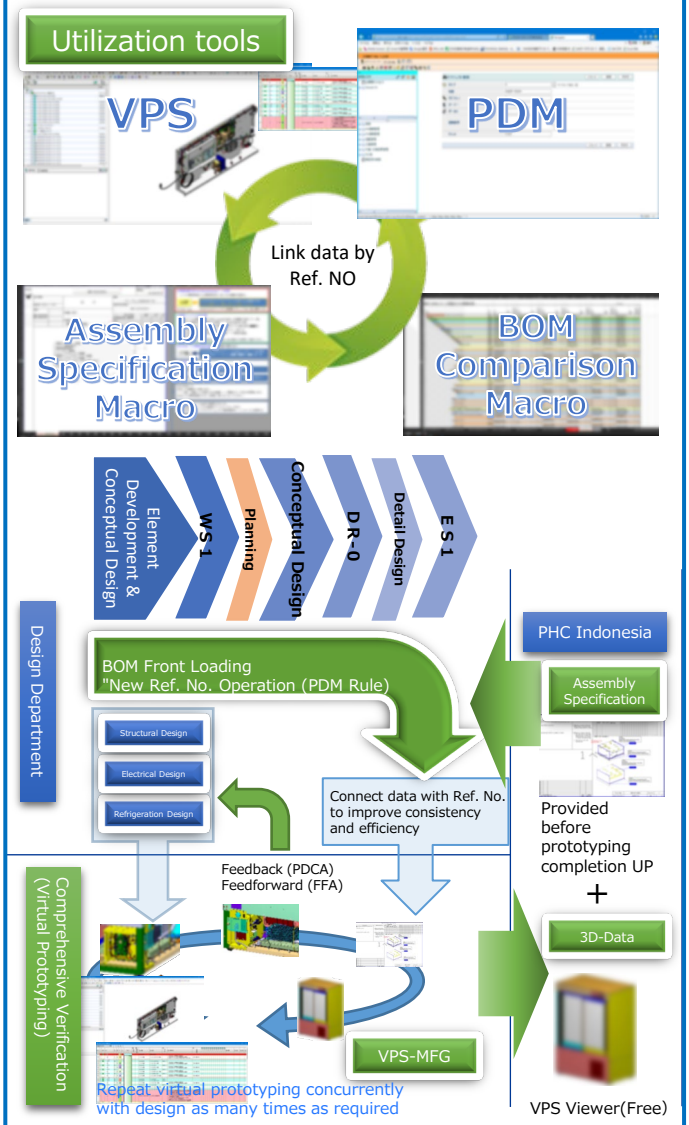
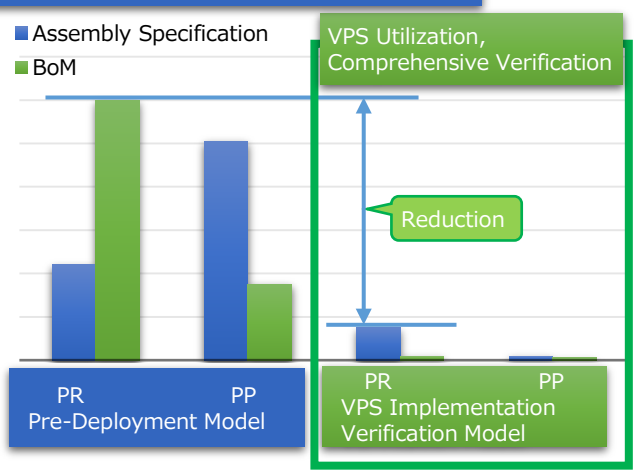


Figure 5: Demonstration of VPS in new product development

As a result of these activities, the completeness of the product was improved by conducting comprehensive verification before prototyping, passing it on to manufacturing in the form of assembly specifications, and having them identify issues during prototyping. Furthermore, the assembly specifications can now be issued during the design completion phase. In addition, the number of specification changes issued was significantly improved by utilizing VPS in the 3-point collation system.



Deployment
・Comprehensive Verification (Deployment of Virtual Prototypes)
・New rule Ref. No.
・New form specifications
Non-designers can write assembly specifications on behalf of the designer.
Achieve 3-point matching of BOMs registered in PDM with EXCEL macro automatic input.

Confirming of this in the specification sheet improves the number of specification changes issued due to inconsistencies.
As a result, the workload of processing operations due to specification changes in each department has also been improved.

Activity Target		Activity Result	
Specification Change	Reduction by 50% or more	Specification Change	Reduction by 88%

Figure 6: Summary of VPS deployment based on proposal

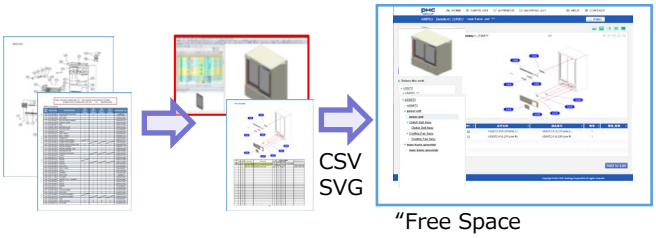
Future Developments

We are further improving operations by providing on-the-job training (OJT) to operators at overseas manufacturing companies.

Additionally, we are also working on the creation of a parts list for repair parts using VPS in conjunction with PDM. Online distribution of these is being considered using SCREEN's Free Space Parts List Builder, which can be created using VPS data.

VPS Utilization for CS Parts List

Same concept as assembly specifications parts list creation
- Automation of creation using VPS
- Integration with PDM



"Free Space Parts List HTML Builder"

Figure 7: Future Development

Company Profile

PHC Holdings Corporation

Head office: 38-5, Nishi-Shinbashi 2-chome, Minato-ku, Tokyo, Japan
Foundation: March 31, 2014: Established as Panasonic Healthcare Holdings
Business: Development, manufacture, and sales of various healthcare
Capital : 36.4 billion Japanese yen (fiscal year ending March 31, 2021)
No. of Employees: Consolidated, 9,753 (as of March 31, 2021)
Home page : https://www.phchd.com/global

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