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Reverse engineering technology in redesign process ceramics: application for CNN plate

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Abstract

PT. Doulton Indonesia is a manufacturing ceramics tableware industry for international brand, and now developing a Low Sag body as a new material. Low Sag body has 2 objectives: efficiency in materials and cost. The problem of this research is how to find a new design that fits with Low Sag body characteristics. Reverse Engineering is usually used to design and to modify a product based on existing products. In this research, the reverse engineering method needs equipment CMM (Coordinate Measuring Machine) to catch data of the CNN plate diameter (220 mm), and change physical data to electronic data that can be processed in software CAD-Power Shape 2015. The output from this research is a new design model, mould as a master mould, and a biscuit prototype of the CNN plate diameter (220 mm) that has a rolled edge shape.

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1. Introduction

PT. Doulton Indonesia is a manufacturing ceramics tableware industry for international brand that incorporated in the WWRD group (Waterford, Wedgwood, Royal Doulton, Royal Albert) for the global market around the world. At 2014 PT. Doulton Indonesia produced tableware with 3 kinds of body: there are Bone China body, Ivory body, and Earthenware body. Bone China body is a ceramic material that includes bone ash in the mixture, the color is white and semi-transparently. Then Ivory body is a ceramic material that has a light yellowish color. And Earthenware body is a

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traditional ceramics material has brownish color. In the mid of 2013 Research and Development (R&D) from PT Doulton Indonesia tried to developing a new ceramics body that looks like Bone China body but not using Bone Ash Materials, the name is Low Sag body. This new body have two objectives, first for efficiency material because this material not using Bone Ash (Bone Ash material is quite expensive). The second, is for efficiency setter because this material is more stronger than bone china, so when firing this material not using setter and not deformed too much. But this low sag body still has not pretty strong enough, when item with low sag body are fired, rim section was dropped. In the ceramics tableware we know there two kinds model first clay model and biscuit model. Biscuit model is clay after firing in temperatur 1180-1195 degree celcius. If firing using setter, biscuit model will be same like clay model. But low sag body firing method does not using setter so clay will be dropped. Then we tried to redesign the clay model of CNN Plate 220 mm, the biscuit model from new clay model is expected same like existing Bone China model. In this research we using Reverse Engineering method to complete this study case, because with Reverse Engineering technology will decrease experimental time and experimental cost.

2. Methodology

In the process of product design there are two kind of engineering design, there are Forward Engineering and Reverse Engineering. Forward Engineering usually called traditional engineering, it starts from the sketch design, then forming a slightly complete solutions, and start drawing three-dimensional diagram, after the market research and making the demand schedule, and then according to the drawing effect chart, three view or creating a simple model after finalizing the design.[1] In the process of design, it needs the united strength to other staff and worker, engineering and technical personnel, to express the designer's idea with samples or physical model. But traditional product design makes samples of each scheme and pays a lot of labor with low precision. It is difficult to adjust and modify the problem higher long design cycle and higher cost.[3] The traditional product design is usually drawn from conceptual design to design, and then manufacturing the product.

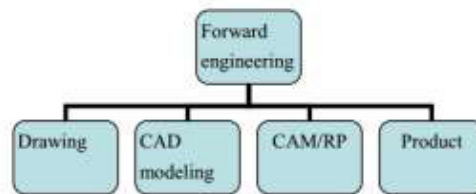


Figure 1. Forward engineering scheme [1]

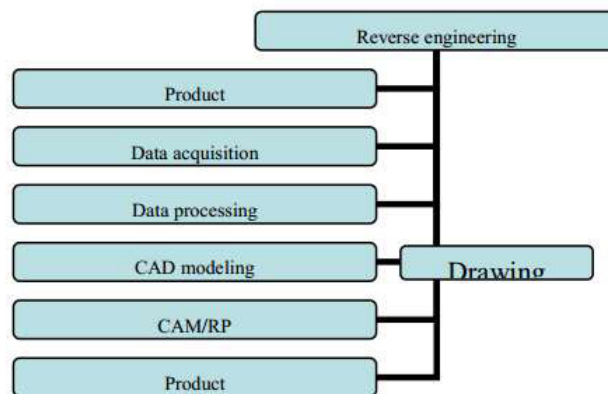


Figure 2. Reverse engineering scheme [1]

Reverse engineering is to extract the data generation pattern, remanufactured product from the parts or raw mode. The following matters need to complete: the software structure, object-oriented development tools, data

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