

Styling Design for 2018 Gold Wing – Clay model –

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ABSTRACT

Seventeen years post its debut, the 2018 Gold Wing was developed in the pursuit of transforming its brand. In this study, we aimed to realize advanced design, functionality, and performance that reflect various changes in the markets, including environmental concerns and transitions in people's values, experienced during those 17 years. A high-quality design that meets every aspect of the requirements was envisioned. To achieve this, design models were fabricated for three individual stages of the design process. The styling theme was determined as "styling with refined sharpness and tension." Based on this theme, we selected the Japanese sword, katana, that symbolizes the culmination of functional beauty, and a track and field athlete, who represents power and muscularity; we set them as the symbolic images for the design. By implementing these image motifs on to the design models, the exterior design aimed for was harmoniously fulfilled with functional requirements, design evolution was achieved, and a design appropriate to representing the developed Gold Wing was established.

1. Introduction

The currently developed Gold Wing represents a full model change, over 17 years, from the previous model. Over the past 17 years, society as well as people's lifestyles and tastes have changed considerably. Therefore, significant changes are needed in design styling to adapt to the pace of society's changing needs and tastes.

This model's development concept was established as, "The Honda Premium Tourer-More exciting and fulfilling riding experiences for rider and passenger⁽¹⁾." In that message, these desires are put in as follows:

- Capture the hearts of new customers in younger generation, in addition to former customers.
- Represent being advanced befitting for the pioneering motorcycle in the era.
- Expand wider the occasions of using this motorcycle to a variety of enjoyable ways, while the opportunities of the use used to be mainly limited for long touring.

In addition to the previous Gold Wing's powerful and majestic styling, the following points were set as the direction for creating this design model.

- (a) Expressing the styling design and the components, to show the appearances that evoke the status of being on cutting edge.
- (b) The co-existence of functionality and beauty

conventionally required of motorcycles, and the expression of the engine in the principal functional role.

- (c) The expression of a versatile range of use from travelling on city roads to long touring.

To realize these elements for next-generation Gold Wing as Honda's flagship model, the targeted development concept required to be expressed as an exhaustive three-dimensional entity. Hence, in this study, we decided to move ahead with the creation of a three-stage model as follows:

- (1) Design concept model (Advanced Design 1: AD1): design study model.
- (2) Issue verification model (Advanced Design 2: AD2): shape compatibility confirmation model for layout of parts and test conditions.
- (3) Production-type model: factory production master model.

The following sections of this paper briefly describe the AD1 model, followed by the detailed descriptions of the AD2 and production-type models.

2. Creation of Prior Study Models, AD1 and AD2

2.1. AD1 (Design Concept Model)

In pursuit of an ideal design, AD1 clay modeling was

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performed on the base of a pre-prototype frame and engine layout.

From the three design directions previously mentioned, as for the item of:

- (a) “Expressing the styling design and the components, to show the appearances that evoke the status of being on cutting edge,” it was realized by the followings:
 - Producing of the likeness of motorcycle by emphasizing of the elements of individual parts.
 - Efficient packaging utilizing the chassis and the vehicle components incorporating the latest technologies.
- (b) To achieve co-existence of functionality and beauty conventionally required of motorcycles in addition to the expression of functional parts centered on the engine, effective exposure of each functional part peripheral to mainly the horizontally opposed six-cylinder engine was obtained.
- (c) To express a versatile range of use, from travelling on city roads to long touring, the realization of a lightweight, compact body, while proportionately maintaining the presence of a flagship model, was achieved (Fig. 1).

2.2. AD2 (Issue Verification Model)

In AD1, which embodied an ideal design-like form, layout feasibility was verified through the frame design division, and steering stability and power performance were verified by each testing division. Based on these results, modifications were made to the clay model to satisfy the required conditions. In order to compare and verify the detailed layout of each component, data from the AD1 and post-change model were overlaid and compared, which produced a large disparity in the context of styling between the models' mounted components such as the frame and the engine owing to a capacity shortfall. For the shape data of AD1 shown in gray, the portions shown in red have gained a larger volume compared to the original shape of the lump (Fig. 2).

To correct and change the data for the areas of insufficiency and required technological conditions, numerically controlled machine tools were used to create another clay model known as AD2.

2.3. Loss of Design Balance with AD2

One can easily predict that developing a beautiful, design-like form cannot be realized with the data correction described in the section above. However, to ascertain a specific directivity for correction, this issue verification model known as AD2 was inevitably a necessary step.

As predicted, the impression created by the sculpted clay model differed considerably from AD1, with an overall loss of balance. The difference in impression was due to a collapse of the basic skeleton seen in the deviation of the mass balance and main character line between AD1 and AD2. As a result, the powerful and majestic styling expressed in AD1 completely failed to be reproduced.

In terms of motorcycle design, the mass balance disposition of solid elements and exquisite balance of each part configured around the main character line are vital elements in realizing the basis of styling. However, this balance, being established by an extraordinarily fine



Fig. 1 AD1 (Design concept model)

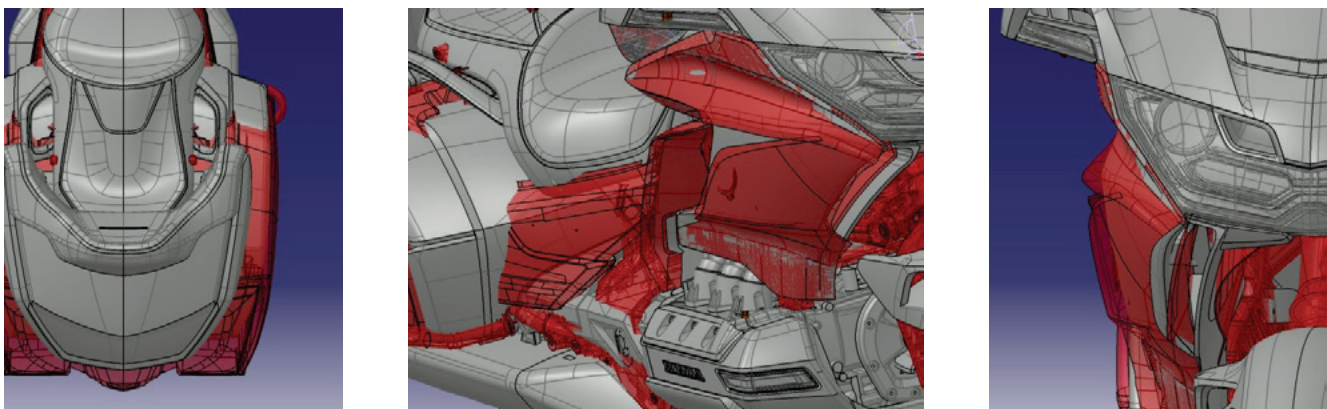


Fig. 2 Differences in styling between concept models of AD1 and AD2



Fig. 3 Beauty in form of Japanese sword

equilibrium is easily destroyed by a variation of a few millimeters. The loss of design balance in AD2 was the result of a method that introduced changes to the completed AD1 through the accumulation of data-based component parts.

3. Reconfiguring Beauty – Creating the Production-type Model

3.1. Rebirth of Styling (Reborn)

A decision was made to create a production-type model reflecting the various issues, divergences, and inadequacies confirmed by AD2. Although considerations were naturally accorded to returning to AD1, it was considered essential to aim for a design surpassing that of AD1 to create a higher-level model.

Work began by reconfirming the charm of AD1 made noticeable by the creation of AD2. By reinterpreting various elements such as the balance, formal energy, and surface tension of AD1, we built our own sensibility into the new model.

This was not the case of creating “something similar” by using data, but of recreating elements absorbed by us through visual and manual effort (Reborn). Through this process, for the first time, it was possible to breathe life into a new form.

3.2. Styling Theme Settings and Considerations

To realize the above characteristics, the key element of a styling theme, “Styling with Refined Sharpness and Tension⁽²⁾,” was set and shared among the design team members. As modelers, we further analyzed our own thinking to determine what the expression should be.

3.2.1. Styling theme studies – ridge line and Japanese sword

The expression “Styling with Refined Sharpness and Tension” initially evoked the traditional Japanese sword in our minds. The Japanese sword (katana) is a symbol of esthetic form, combining sharpness, beauty, and strength within its functions. The ridge line of the blade (character line) with these elements as its background is breathtaking

in its beauty (Fig. 3).

Beauty along with a unique strained tension is felt through the functional esthetic, born of the literal sharpness of the blade. The beauty of the ridge line and hardness of the blade, born of the rationale for a clean cut at one stroke, and its inherent flexibility, are the inevitable results of the process of forging, “sunobe” stretching, shaping, quenching, and sharpening of the blade. Superimposing the beauty displayed by the katana ridge line on the character line of the clay model, we gave a concrete expression to the theme, “Styling with Refined Sharpness and Tension.”

3.2.2. Styling theme considerations – surface expression and muscularity

A surface expression motif that came to mind as a counterpart to the katana’s ridge line motif was the muscularity of a top athlete. These were the muscles tempered to the limit and including the powerful instantaneous quality and stamina of a track and field athlete (Fig. 4).

Muscles specially adapted for the act of running express that function in their very form. We considered a surface expression that resembles the muscles of a track and field athlete to be the most appropriate means of expressing the 2018 Gold Wing, which aims for a lightweight compact



Fig. 4 Muscles appearing on body of top athlete

design through the reduction of each component.

Essential to a muscular motif is the relationship produced with the internal skeletal structure. In the examples of drawing or sculpture of a human body, what they do is not just copying the visible appearance from outside. Through imaging of the skeleton embedded in the muscles and interpreting the balance and muscular tension as controlled by the laws of gravity, an accurate depiction first becomes possible. Shaping that lacks this awareness will result in a breakdown at the visual level.

Therefore, we considered that without the reasoned shaping and surface expression based on the skeleton of a new production-type model, formation of a clay model surpassing AD1 would not be feasible.

Hence, we proceeded to express the styling theme “Styling with Refined Sharpness and Tension,” considering the powerful muscles of a track and field athlete as a motif.

3.3. Design of the Basic Skeleton

The “Styling with Refined Sharpness and Tension” styling theme is not limited to the design of just the outer packaging. The basic skeletons of the frame and engine are also important styling elements. Hence, a styling theme must also be embodied for these features.

Specifically, when it comes to the main frame, from pivot plate to header pipe, a thorough rigidity was expressed through formal constriction. Moreover, the minimization of the frontal edge curvature creates powerful shading, with the beautifully tense ridge line implemented in just the way the ridges of a sword consistently travel the length of a blade (Fig. 5).

For the design of the engine’s external appearance, the cylinder head cover was shaped as the same as the frame to resemble sword ridges. Furthermore, a sharply constricted shape for the lower cowl generated a form with the powerful tension and modulation of an athlete’s muscles (Fig. 6).

3.4. Character Lines

To transmit the styling heritage handed down from the



Fig. 5 Representation of styling concept on basic body skeleton

previous-generation models to the currently developed Gold Wing, we took up the precedent of the two following character lines. Figure 7 is an image of the previous-generation model and its character lines.

(1) Horizontal line: line displaying a stately stability in its horizontal keynote.

(2) Backward-leaning character line: line running from the upper portion of the deflector to the pannier case.

We decided to express a styling with a total of three character lines by adding, to the above-mentioned character lines, a new main character line displaying the inherent personality of the currently developed Gold Wing. The three character lines are as follows:

(1) Horizontal line (mechanical line).

(2) Backward-leaning character line.

(3) Main character line.

With regard to the current development, we named the horizontal line the “mechanical line,” making it the keynote line for expressing the model’s motorcycle-like quality through functional parts, including the engine (Fig. 8).

The main character line we newly set this time is a vital



Fig. 6 Appearance of engine design



Fig. 7 Character lines applied to previous model of Gold Wing

character line for the creation of the beauty of modeling, through which sharpness, magnificence and the forces like a katana are exhibited. We made this the essential line to express a sense of leaping forward and advancement into the next-generation motorcycle. Furthermore, this line did not depend on data, but became the formal foundation of the rebirth of the clear-cut image possessed by the AD1.

Through the respective shaping of these three lines, we expressed the sense of power generated by the muscles, trained to the highest pitch, of a track and field athlete in the surface expression (quality) of each part.

In forming an integrated whole comprising the functional beauty of individual parts for the overall body, we provided an overall mass balance as well.

3.5. Principal Parts Configuring the Main Character Line

3.5.1. Front fairing

Front fairing is morphologically the tip of the main character line, while simultaneously being an important part for influencing the quality of wind protection. While clearly maintaining the main character line, a wind protection performance suited to the Gold Wing with potential speeds exceeding 200 km/h is required.

To realize this, in maintaining protection performance, we slanted the front mask (frontal area of the front fairing), except for the major character lines, and we reduced its presence as much as possible. Then, we arrayed the solid elements in a forward direction, emphasizing the “mass forward” shape. In doing so, while guaranteeing comfort for the long touring, we also suited the fairing for short touring and achieved a “sporty” design windshield shape.

For front fairing peripheral parts for which compatibility with functional conditions is required, our design was based on the posture of a track and field athlete at the instant he drives into the wind and breaks into a sprint.

By using obtuse angles, the curvature of the cross-section of the ridge line (blue line in the center of Fig. 9), running from the headlights through the front fairing to the

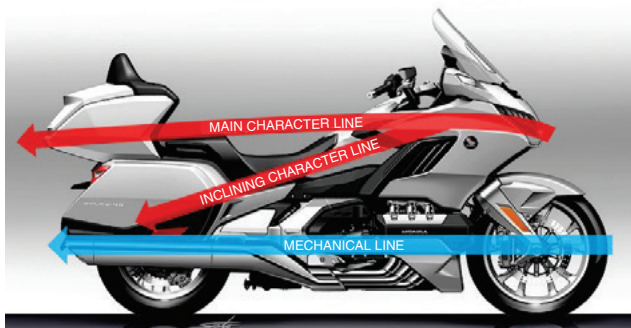


Fig. 8 Three lines that constitute styling of developed Gold Wing

indicators, was minimized as much as possible. This is the start of the main character line equivalent to the tip of the katana (Fig. 10).

The expression of surface change enabled by the limited curvature fulfills an effective role in modulating the impression when facing the Gold Wing from the front (Fig. 9).

3.5.2. Middle cowl, seat, and trunk

The middle cowl generally occupies the largest area of all the exterior parts. Owing of this, the middle cowl design has a major influence on the impression conveyed by the overall vehicle design.

To clearly express the main character line, we



Fig. 9 Front design fulfilling characterized design expression and performance



Fig. 10 Slanted front mask, with obtuse-angled surfaces and small radius corner, representing forward mass concentrated looks

maintained a constant tension in the line running from the side of the headlights, byway of the top face of the passenger seat, to the side panel of the top box. We implemented a tense and sharp ridge line just like the blade of the katana, where it runs from the tip to the end of the blade (Fig. 11).

Considering the external line of the middle cowl as part of this ridge line, we fused it with the flow of the main character line shaping the overall structure. Boldly compressing the top surfaces of the side radiators inward, we applied deep shading to the design (Fig. 12), and in addition, we narrowed down the lower side portion of the middle cowl so as to link it with the intake manifold. Through these changes, we implemented a solid sculpted look. By endowing the whole structure with a liquid sense of power exuded by the connotation of the inward muscular potential, we expressed an athlete's physique.

By implementing this expression, we preserved a constant tension throughout the entire vehicle design and were able to effectively express the main character line traversing the vehicle body in a three-dimensional context (Fig. 11).



Fig. 11 Main character line of developed Gold Wing



Fig. 12 Middle cowl with mass boldly removed inward

4. Verification of Co-existence of Performance and Design Using a Test Vehicle

Customers' enjoyment of a comfortable touring experience is, as it was previously, an important factor for the currently developed Gold Wing. For that purpose, it is a prerequisite to be able to provide a high-quality ride and light and comfortable running. However, the aforementioned tension-displaying cowl surface configuration and character lines do not necessarily contribute to wind resistance and, depending on circumstances, may even serve as a hindrance. Therefore, to establish the forms required by the design and shape needed for high wind resistance, shape changes in 0.1 mm units and evaluations were repeatedly conducted.

In Fig. 13, the yellow-colored portions are the areas to which changes of shapes have been applied by even to the precision of 0.1 mm. The trials and errors for finding the shape fulfilling both requirements were done in cooperation between the designers and the engineers. This was realized through repeated changes using wind tunnels, and steering stability and power performance tests. Figure 14 shows

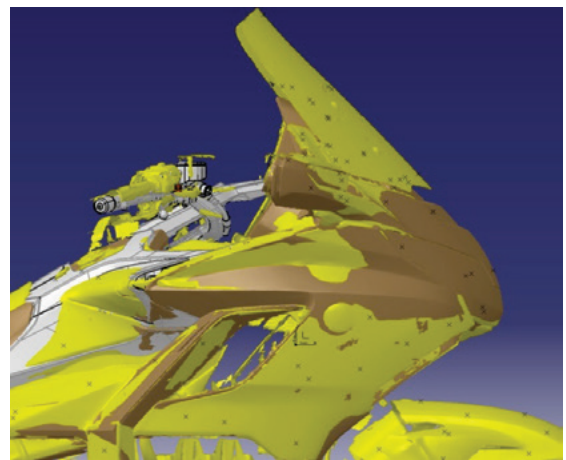


Fig. 13 Changes to satisfy design and performance requirements

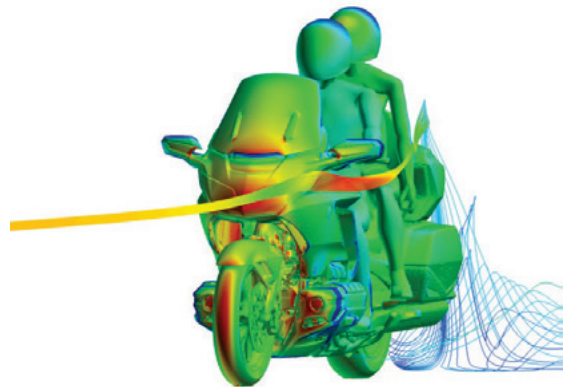


Fig. 14 Realizing compatibility between design and performance through repeated tests (example of CFD analysis)

confirmatory examples from shape data acquired by Computational Fluid Dynamics (CFD).

5. Completion of the Model

As modelers, the mission we were tasked with was to create an appealing solid entity by bringing together functionality, performance, and design on an elevated level. To achieve this, a high degree of creativity was required to establish a solid form from images sketched on a flat surface. The currently developed Gold Wing, born through a conviction that permitted no compromise, down to the finest parts, and a persistent pursuit, is a model fastidious in every circumstance required by design. Figures 15 and 16 show the completed clay and mockup models, respectively.



Fig. 15 Completed clay model of developed Gold Wing



Fig. 16 Completed mockup model of developed Gold Wing

6. Summary

To develop a production-type model, we needed to bring together the AD1 design concept model and requirements from the component side. To achieve this, reinterpreting these elements at the clay modeling stage and adding the new styling theme, “Styling with Refined Sharpness and Tension,” proved effective.

We used our visual and manual skills to recreate these reinterpreted elements (Reborn) for modeling. At that time, setting as images “the traditional Japanese sword, symbolizing the acme of functional beauty” and “a track and field athlete possessing powerful muscles,” and in proceeding to form these, we completed styling for a production-type model.

It is our earnest wish that the modeling created for the currently developed Gold Wing and styling born of it will lead to a high level of customer satisfaction and long-lived presence in our customers’ hearts.

References

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