

Introduction of Products

Stress-free Cab WA470/475-10

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The new “Stress-free cab” that was fully remodeled to improve product appeal with the concept of “universal design,” “intuitive interface,” and “improvement of visibility,” has been developed with the WA470/475-10 wheel loaders and introduced to the market. The main features are presented in this report.

Key Words: *WA470-10, WA475-10, Wheel loader, Stress-free, New design cab, Universal design, Operator’s seat, Intuitive interface*

1. Introduction

The Komatsu medium-size wheel loader cab, which had not changed the basic design up to the conventional WA-8 type, was introduced to the market as WA470/475-10 with a major change in design for the first time in about 10 years.

Considering the trend of model changes of competing machines, there are high demands for model change around the driver’s seat, which contributes to ease of driving, productivity and safety for operators. We have developed a stress-free cab incorporating the latest technology with “stress-free operation” listed as the keyword in this development. The outline is introduced in this report.

2. Aims of development

With stress-free operation as the keyword, the exterior and interior of the cab have been significantly changed from the current model 6 design.

Based on this keyword, the devices inside the cab were designed from the following three concepts. The first point is “universal design” that provides the optimum driving environment even for various body shape differences of operators. The second is that the operation switches and knobs required for work are not just lined-up switches but have the “intuitive interface” newly designed by carefully examining the shape and direction in which the operator can operate them intuitively. The third is “improvement of visibility”, which has been achieved by implementing a variety of ideas to maximize

the visibility from the operator when working. From these concepts of view, the development of a cab that has been dramatically improved has been realized in line with WA470/475-10.

3. New design cab

The overall structure of the cab has been changed from the current 6-pillar structure to a 4-pillar structure, which greatly improves the rear visibility compared to the conventional structure.

The appearance of the cab is designed to arrange glass on the outer surface of these four pillars, covering the entire circumference continuously with the glass surface and preventing the pillars from being seen from the operator.

In addition, curved glass is used for the front glass and the size is increased to greatly improve the visibility around the bucket compared to the current model.

The rear glass is tilted backward to provide a new silhouette, which has never been seen before, in order to provide sufficient reclining space for tall operators in a limited space.

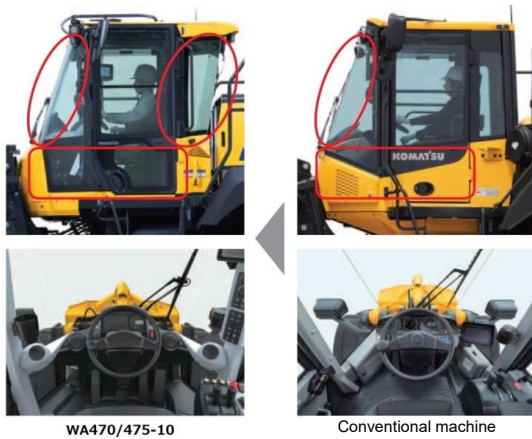


Fig. 1 New design cab
- Comparison with the current model



Fig. 2 New design cab - Appearance

For the interior, together with the Design Group of the Product Marketing Division, we have studied a design considering details such as modeling and coloring so that we can express a generally comfortable operating space while ensuring maximum functional aspects such as visibility and operability.

For the front part, the areas around the air conditioner grilles located near the pillars are designed to be integrated with the pillar cover, and the outside of the right console is colored in the same color, so the part is also integrated with the rear console to give the operator a sense of unity that wraps around, while considering operability.

In addition, the front resin covers are made as compact as possible in order to achieve good visibility, and the shape is made to take advantage of the sharp edges to give a slim and modern impression.



Fig. 3 New design cab - Interior front



Fig. 4 New design cab - From above



Fig. 5 New design cab - Toward the rear

4. Universal design

Based on ergonomics, we have realized a driving environment that can be adapted to people of various physiques, from tall Western operators to short operators such as women.

Specifically, the arrangement and adjustment ranges of the operator's seat have been optimized so that the operator can adjust to the best position to minimize fatigue even when operating for a long time. In addition, a newly designed steering column and right console have been adopted so that the operator can operate easily while maintaining that position.

Universal design has been implemented for the arrangement and function of glass, monitor, and switches so that all operators can secure ambient visibility.

The details are introduced below.

4.1 Operator's seat

By devising the equipment layout inside the cover and the cover shape at the rear of the cab, the backward adjusting travel of the operator's seat has been especially increased compared to the current model.

This makes it possible for operators of various physiques, from short to tall, to drive by adjusting the operator's seat in a position that is natural for each operator.

4.2 New steering column

The steering column has been arranged so that the operator can adjust to the best position by adjusting the tilt angle and telescopic extension/contraction to minimize fatigue even when operating for a long time.

It also has a structure that can be flipped up and stowed by simply stepping on the pedal, so the operator can get on and off in a comfortable position. When getting on the machine, the column position can be easily restored by moving with both hands while stepping on the pedal.



Fig. 6 Stowable steering column

4.3 New console

Armrest left/right and console up/down tilt adjustments (optional) have been added to enable adjustment in 5 directions.

Adjusting the backward/forward and up/down tilting of the console can be done in a simple one-action operation.

This makes it possible for operators of various physiques to adjust the work equipment levers at hand according to their relaxed positions.

Although the number of adjustment points have been increased, the console has a sense of rigidity and is designed for easy operation of levers.

In addition, the console is wider toward the front and provides a natural driving position from elbows to palms. The space efficiency has been considered to allow room around the legs, especially around the knees.

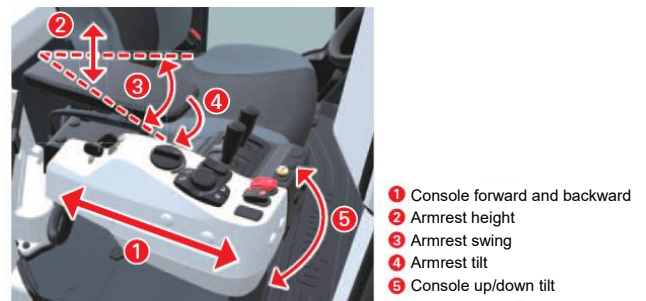


Fig. 7 5-way adjustable console



Fig. 8 Console layout

4.4 Expansion of glass area

In order to ensure visibility around the bucket while keeping the position comfortable for operators of all physiques, curved glass is newly adopted for the front glass. Along with this improvement, a new windshield wiper with a larger wiping area than the current model has been adopted to improve visibility during rainfall.

In addition, UV cut glass has been newly adopted to give consideration to suppressing sunburn and making the driver's seat friendly also to female operators.

4.5 Universal design for monitor switches

The function display of each switch is a pictorial display that shows the function regardless of the language, and the display size is easy for even elderly people to read.

In addition, considering color vision variation of operators, color universal design has been adopted for such as displays on the monitors. The displays are designed in colors so that people with various types of color vision characteristics can also secure visibility.



Upper: Bucket loading quantity
Lower: Total loading quantity/target loading quantity
Change in real time

Fig. 9 Color universal design display

5. Intuitive interface

An interface that allows access and intuitive operation while sitting in position has been provided to realize stress-free machine operations and controls.

Specifically, we reviewed the switch arrangement from the point of view of operability. We newly developed the command selector and air conditioner control panel/switch module, and reviewed the shape and switch arrangement of work equipment levers.

The details are introduced below.

5.1 Switch arrangement

Switches frequently used during work are arranged on the right console, and the other switches are grouped as switch module on the right A-pillar.

For further improvement of operability, a command selector is mounted on the right console to narrow down the total number of switches, while intentionally leaving frequently used switches as independent switches.

Through these measures, the operator can access the switches while keeping his/her posture, reducing fatigue and achieving comfortable operation.



Fig. 10 Switch layout around the right pillar

5.2 Command selector

The newly developed command selector makes it possible to perform intuitive operation while looking at the monitor screen. It enables smooth and stress-free operation without searching for a button. Since the knob is larger than the conventional buttons, the operability with gloves on is also improved. The shortcut keys also contribute to improving convenience.



Fig. 11 Command selector

5.3 Air conditioner operation panel

The pushbutton type has been changed to the dial adjustment type to enable intuitive operation without carefully looking at the switch. Since the knob is larger than the conventional buttons, the operability with gloves on is also improved.

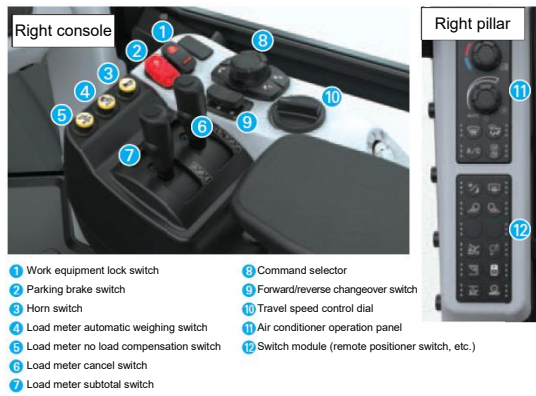


Fig. 12 Switch module

5.4 New multifunction lever, advanced joystick steering system (AJSS) lever

The shapes of multifunction levers including the AJSS lever have been designed so that they will naturally give the optimum grip to anyone. A switch arrangement that allows intuitive operation with little finger movement has been realized.



Fig. 13 New multifunction lever

6. Conclusion

This report has introduced the “Stress-free cab” that was developed in line with the full model change of Komatsu’s next-generation medium-size wheel loader. We take pride in the fact that we have taken in many opinions and requests from the operator’s perspective and finished the product to make our customers happy more than ever. In addition, our arrangement considering the design was so highly evaluated and the WA475-10 won the 2019 Good Design Award. We will continue to focus on expanding the lineup of “Stress-free cabs” while receiving feedback from customers.

Introduction of the authors



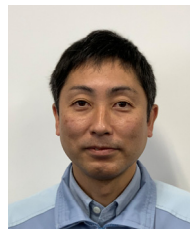
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[A comment from the authors]

In this development, we encountered many difficulties because the cab was designed from scratch in accordance with the full model change, but we feel that our hard work during development paid off while receiving favorable words from customers for the unique design and ease of driving. Without being content with this evaluation, we would like to continue to incorporate many customer feedback and utilize it in product development that will satisfy customers. We would like to thank all the people involved in this development very much.