

# Coverage Checker: UV Light Version

## A More Applicable and Useful New Device

**WE ARE PLEASED** to introduce a new Coverage Checker using ultraviolet light.

### 1. Background of development

Coverage Checker has been designed for easy and precise coverage measurement in place of human eyes. It is mainly used for the quality check on automobile parts after shot peening or blasting.

However, some customers asked us to make the creation of a “recipe” easier. The recipe is a set of measurement condition and calibration line between the number of pixels in an image and coverage% on the parts surface determined by human eyes.

In order to simplify recipe creation, the surface condition before shot peening should be uniform under all measurement conditions.

So, we considered combining the fluorescent paint “Peen Scan Pen” handled by Electronics Inc. with Coverage Checker. As a result, we have developed Coverage Checker UV light version (Fig. 1) with a coverage measurement system that can respond to one fluorescent paint with only one recipe.



Fig. 1 Image of Coverage Checker UV light version.

### 2. Outline of Coverage Checker UV light version

Coverage Checker UV light version (hereinafter, UV-CC) uses UV LED with a wavelength of 375 nm as a light source and measures the degree to which the fluorescent paint applied in advance on the surface to be measured has been peeled off by shot peening or shot blasting. It has the following characteristics.

#### 2.1 Fluorescent paint

The color components to be detected can be arbitrarily selected from all hues. There is no restriction on emission color of the fluorescent paint that emits at 375 nm UV light.

The surface irradiated with UV light emits a slightly purple glow due to the purple component near the UV. For precise coverage measurement, it is recommended to use a fluorescent paint that emits red to green light with wavelength of 500 nm or more.

#### 2.2 Modified algorithm

The normal type TOYO SEIKO Coverage Checker calculates the coverage% on image data captured by pressing the shutter. In this case, only the area selected by the operator is measured, but there is a possibility that other areas with lower coverage% may be missed.

In UV-CC, the algorithm has been changed so that the coverage% is always displayed on screen for obtaining live image (Fig. 2 on next page). As a result, the operator can determine the coverage% of the required area after grasping the coverage% distribution of the entire measurement target area or the entire part.

#### 2.3 Increased worthiness as evidence

The coverage% measurement value can be recorded on the captured image obtained by pressing the shutter. With the normal type TOYO SEIKO Coverage Checker, the entire measurement screen including coverage% could be recorded, but with UV-CC, the captured image and the measurement coverage% can be recorded in association (Fig. 3 on next page). This function can increase the reliability of recording

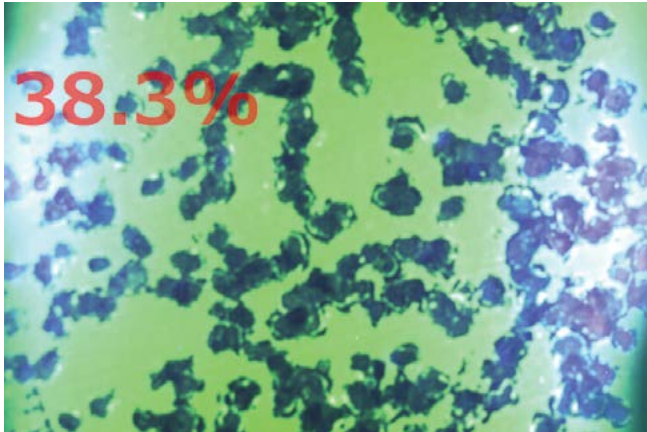


Fig. 2 Coverage% displayed in live images.

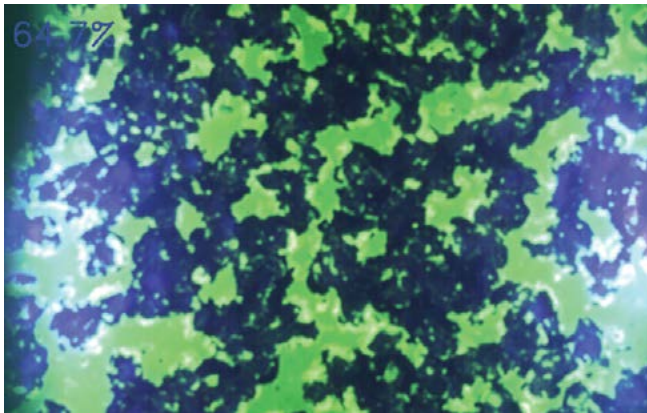


Fig. 3 Captured image including coverage% value.

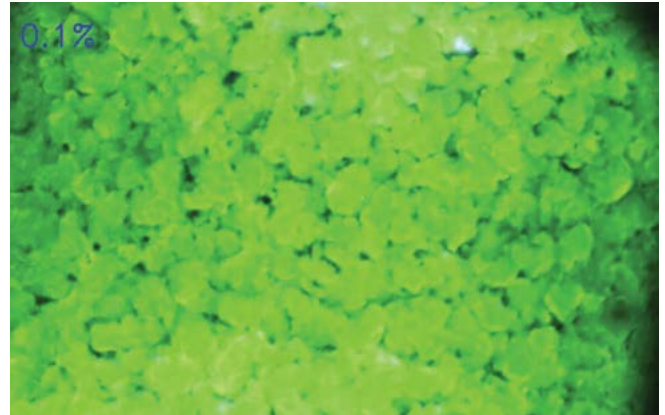


Fig. 4 It is confirmed that the coverage is almost 0% on the surface where the fluorescent paint was applied after shot peening with full coverage.



Fig. 5 UV-CC at a steel bridge repair work site.

as a coverage% measurement result. It is also possible to choose to hide coverage% measurement result.

#### 2.4 Other specification

The specifications of UV-CC are shown in Table 1.

Table 1 Primary specification of UV-CC

<b>Number of pixels of light receiving unit</b>	360,000 pixels
<b>Light source</b>	Ultra-violet LED light (Wavelength 375 nm)
<b>Lens</b>	Macro lens system (0.5x magnification)
<b>Area size of measurement</b>	4.8 mm × 3.6 mm
<b>Measurable radius of curvature</b>	Minimum 5 mm

#### 3. Specific advantage of UV-CC

UV-CC can handle the following cases that could not be applied before.

- It can measure on surfaces such as carburized parts which are difficult to dent by shot peening.

- It can measure on surfaces that already have indentations such as two-step shot peening (Fig. 4).
- It can measure on surfaces with heat-treated scale regardless of the type of scale.

#### 4. Application

In Japan, shot peening is performed to apply compressive residual stress to HAZ of welded area of steel structures. It can realize long service life against damaged area of aging steel structures with low cost. In public constructions, operation and inspection methods shall be specified and documented. UV-CC is registered as an inspection method after shot peening and is being used in applications such as steel bridge repairs (Fig. 5). ●

#### Contact Information

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