Comments for Surface Characteristics of Low Carbon Steel JIS G3101 SS400 after Sandblasting Process by Steel Grit G25

Reviewer 1:

1. Figure 1 is not necessary. It can be removed
2. Figure 2: Use a larger magnification to make grit shape visible
3. Fig. 3: Have you applied some movement to the nozzle during sand blasting in order to treat all the surface of the plate?
4. Fig. 3: Blasting angle in Fig. 3 is not 90º.
5. Page 4, line 43: Have you prepared the plate surface (ground and polished) before the HRC measurements?
6. Page 4, line 45: Which load have you used in the microhardness tests?
7. Page 5, line 8: You have treated the plates for a short time. Single impacts rather than fatigue seems to be the reason for surface crack appearence.
8. Fig. 5: Don´t you have some grit embbeded in the plate surface?
9. Fig. 8: The HRC scale starts in 20. As your Rockwell hardness is lower, you may use the HRB scale
10. Page 7, line 32: Which is the initial hardness of the plate (before sand blasting)? Show the original hardness on the figure. The observed increase in hardness may be due to plastic deformation. I guess temperature increase and carbon diffusion may be not relevant in this case.

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Reviewer 2:

1. Introduction Part: There is a brief literature review about the usage of Al2O3 along with its benefit and the drawback for sandblasting. That is always good to refer to the existing material for sandblasting. However, there is no clear transition why this research used steel grit G25. There is not enough analysis to support the usage of steel grit G25 for sandblasting.
2. In section Paint Coating Thickness Test: please correct the English grammar of this sentence. It is confusing and not easy to understand.
   'The method used, namely tracking the sensor on the surface of the material, the resulting paint thickness will be seen on a digital screen on the tool measure it. The thickness of the paint layer of the sandblasting surface characteristics with the test parameters used in this study is as in Figure 9 as follows.'
3. In Section Paint Coating Thickness Test, the authors claimed good results have been obtained in Figure 11. However, there are no discussion in this part. Add more discussion and compared with some references.
4. Other data are fine and possible for publication.

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Answer:

1. Reviewer: Figure 1 is not necessary. It can be removed.

   Comment:
   Thank you very much for your suggestion. Figure 1 has been removed from the script.

2. Reviewer: Figure 2: Use a larger magnification to make grit shape visible

   Comment:
   Thank you very much for your feedback. Figure 2 (become Figure 1) has been replaced with a larger magnification so that the shape of the grit can be seen clearly.

3. Reviewer: Fig. 3: Have you applied some movement to the nozzle during sand blasting in order to treat all the surface of the plate?

Comment: This research considered the real application in the field that is done statically perpendicular (90^o) to the surface.

4. Fig. 3: Blasting angle in Fig. 3 is not 90^o. It changes to Figure 2.

   Comment: Figure 3 has been fixed at an angle of 90^o to the surface. It becomes Figure 2.

5. Reviewer: Page 4, line 43: Have you prepared the plate surface (ground and polished) before the HRC measurements?

   Comment: The plate surface was not ground or polished, but it was directly hard tested after sandblasting to analyze hardness changes in plate surface after sandblasting.
   Add the words on the sentence "The Rockwell hardness test of ASTM E18-15 Scale B was implemented directly (without ground and polished processed) to measure the surface hardness profile across the surface from left to right at 25, 45, 65, 85, 105, and 125 cm in one straight line. Changing into HRB related to review point 9 below.

6. Reviewer: Page 4, line 45: Which load have you used in the microhardness tests?

   Comment: The load used is 10gf with a magnification of 10 times. Therefore, the sentence "The micro-Vickers hardness test was done by ASTM E384-11 at depths of 50, 100, 150, 200, 250, and 300 µm to understand the extent of the hardened layer" is changed into "The micro-Vickers hardness test was done using ASTM E384-11 with 10gf load at depths of 50, 100, 150, 200, 250, and 300 µm to understand the extent of the hardened layer."

7. Reviewer: Page 5, line 8: You have treated the plates for a short time. Single impacts rather than fatigue seems to be the reason for surface crack appearance.

   Comment: Thank you for the suggestion. The cause has been replaced by an impact only.
   The sentenvce become "The micro-cracks structure is most likely due to collision (impact) during the sandblasting process."

8. Reviewer: Fig. 5: Don´t you have some grit embedded in the plate surface?

   Comment: From the SEM image, it is seen that steel grit enters the plate surface. This information has been added in Figure 5 and added to the sentence text on page 5.
   Add sentences "Moreover, some grits can embed in the surface during the blasting process because grit attaches the soft area of the surface."
   Correct the snetences "It was found that by employing steel grit G25 as the abrasive material, besides a collision, steel grit was also deposited in the surface during the sandblasting process. As a result, the carbon content increase in the surface."

9. Reviewer: Fig. 8: The HRC scale starts in 20. As your Rockwell hardness is lower, you may use the HRB scale.

   Comment: Hardness testing with the HRB scale has been carried out and the results, as shown in Fig 8 (become Fig. 9).

10. Reviewer: Page 7, line 32: Which is the initial hardness of the plate (before sand blasting)? Show the original hardness on the figure. The observed increase in hardness may be due to plastic deformation. I guess temperature increase and carbon diffusion may be not relevant in this case.

    Comment: The initial hardness on the plate has been added in Fig. 9. Thank you very much for your correction. Change the word “extending the blasting duration” with ‘by plastic deformation”. We have changed about the observed increase in hardness due to plastic deformation. Paragraph about carbon diffusion is deleted.

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2. In section Paint Coating Thickness Test: please correct the English grammar of this sentence. It is confusing and not easy to understand. .
   'The method used, namely tracking the sensor on the surface of the material, the resulting paint thickness will be seen on a digital screen on the tool measure it. The thickness of the paint layer of the sandblasting surface characteristics with the test parameters used in this study is as in Figure 9 as follows.'
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4. Other data are fine and possible for publication.

Answer:

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   Comment:
   In fact, Al_2O_3 is the best and prospective material for the sandblasting process. However, this material is costly and has so many drawbacks. Therefore, it needs an alternative particle so that it can replace this Al_2O_3 function. In this case, we use Steel Grit 25. Reused of particle Steel grit is also investigated to reduces cost.

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'The method used, namely tracking the sensor on the surface of the material, the resulting paint thickness will be seen on a digital screen on the tool measure it. The thickness of the paint layer of the sandblasting surface characteristics with the test parameters used in this study is as in Figure 9 as follows.'

Comment:
Thank you very much for your feedback. We have deleted the sentences "The method used, namely tracking the sensor on the surface of the material, the resulting paint thickness will be seen on a digital screen on the tool measure it". We correct the sentences " . *The thickness of the paint layer of the sandblasting surface characteristics with the test parameters used in this study is as in Figure 9 as follows.'* with "The width of the paint layer of the sandblasted surface used in this study is as in Figure 11 as follows."

3. In Section Paint Coating Thickness Test, the authors claimed good results have been obtained in Figure 11. However, there are no discussion in this part. Add more discussion and compared with some references

Comment:

Based on Nazir, Khan, and Stokes (2015) research, it was found that debonding driving forces decrease with increasing interface roughness and coating thickness. It was also found that the critical value of point surface roughness value was Ra 4 µm, and the threshold of coating thickness was 34 um (Nazir, Khan, Stokes, 2015). Therefore, the lowest coating depth in this research (94.14 µm) is higher than the critical value (34 um), and the lowest surface roughness (Ra 18.1 µm) is better than the threshold value (Ra 4 µm).

4. Other data are fine and possible for publication.

Comment:
Thank you very much