

Unit 10 - Week 8

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Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

1) The ratio of strain coefficient K to Young's modulus E for four photoelastic coatings follow the relation $A > B > C > D$. Of the four coatings, which would be the ideal choice for a reflection photoelastic analysis? (Enter A, B, C, or D as the answer)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) A

1 point

2) Consider the Table given below:

Material	Name	Young's modulus (GPa)	Strain coefficient
A	Polycarbonate	2.21	0.16
B	Polyester	3.86	0.04
C	PS-3	0.21	0.02
D	Polyurethane	0.004	0.008

One needs to perform a reflection photoelastic analysis on a Silicone rubber specimen having a Young's modulus of 0.05 GPa. Of the four coating materials listed in the table, which would be the ideal choice? (Enter A, B, C, or D as the answer)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) D

1 point

3) Best practice to handle stress concentration regions using photoelastic coating is:

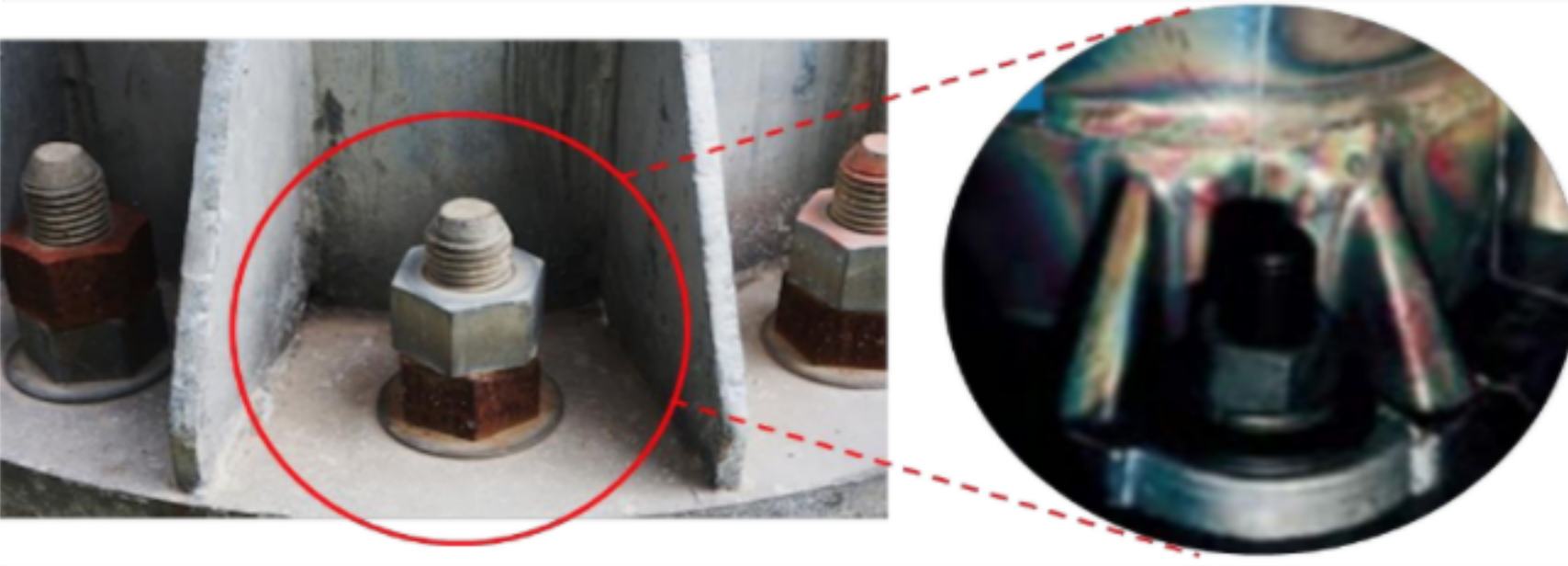
- Apply a thick coating first to identify the stress concentration regions. Now paste a thin coating over the thick coating in the region of stress concentration
- Apply a thin coating first to identify the stress concentration regions. Now remove the thin coating and apply a thick coating in the identified zones
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No, the answer is incorrect.
Score: 0

Accepted Answers:
Apply a thick coating first to identify the stress concentration regions. Now remove the thick coating and apply a thin coating in the identified zones

1 point

4) Figure below shows the fringes observed in a photoelastic coating test conducted on the bolted base of a lamp post. The isochromatic fringes qualitatively show the presence of:



- Residual stresses
- Assembly stresses
- Thermal stresses
- Fatigue stresses

No, the answer is incorrect.
Score: 0

Accepted Answers:
Assembly stresses

1 point

5) Which of the following statements are true regarding the correction factor for bending of plates:

- Correction factors are applicable for thin or medium thick plates, in regions of uniform stress
- For the restricted case of pure bending loads, the correction factor may also be applied to thick plates
- Correction factors are applicable even in the presence of geometrical discontinuities such as a hole or a series of holes
- Correction factors are not applicable when the plate has an abrupt change in thickness

When there is no Poisson's ratio mismatch between the specimen and the coating, correction factor for bending (R_y^b) is equal to the correction factor for bending of plates (R_y^{bp})

No, the answer is incorrect.
Score: 0

Accepted Answers:
Correction factors are applicable for thin or medium thick plates, in regions of uniform stress
For the restricted case of pure bending loads, the correction factor may also be applied to thick plates
Correction factors are not applicable when the plate has an abrupt change in thickness
When there is no Poisson's ratio mismatch between the specimen and the coating, correction factor for bending (R_y^b) is equal to the correction factor for bending of plates (R_y^{bp})

2 points

6) On a 30 mm thick mild steel specimen having a Young's modulus of 210 GPa, a photoelastic coating of 8 mm thickness is pasted. The coating is made of polycarbonate having a Young's modulus of 3 GPa. The coated specimen is subjected to bending. Find the position of neutral axis of the coated specimen measured from the top surface of the mild steel specimen?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 14.95,14.99

2 points

7) A flat rock sample having a Poisson's ratio of 0.15 is coated with a 3 mm thick polycarbonate coating having a Poisson's ratio of 0.28. When the rock is subjected to axial compressive load, a fringe order of 0.5 is observed at the interior boundary of the coating (which is in contact with the specimen). Considering Poisson's ratio mismatch, what would be the fringe order observable at the exterior boundary of the coating (which is exposed to atmosphere)?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.52,0.60

2 points

Some regions of a fibre reinforced plastic boat needs to be studied by photoelastic coating. A coating suitable for the study of non-metallic material is selected and the calibration of the coating material ($E_c = 0.21 \text{ GPa}$ and $\nu_c = 0.4$) is sought to be done by a tension test on the coating directly by transmission photoelasticity. It is proposed to use white light for the conduct of the photoelastic coating test (wavelength can be considered as 577 nm). The test section of the tension specimen is of 25 mm width. The thickness of the tension specimen is 2 mm and for a load of 250 N, the fringe order observed is 2.6

8) Determine the material stress fringe value (in N/mm/fringe)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 3.50,4.00

2 points

9) The material strain fringe value is ____ $\times 10^{-2}$ mm/fringe

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.20,2.80

2 points

10) The strain optic coefficient is ____ $\times 10^{-2}$ fringe

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.10,2.40

1 point

Correction factors are important in data interpretation of photoelastic coatings. They are the functions of the loading, thickness ratios and also depend on the elastic properties of the coating and the specimen materials. Consider that the specimen material is an Aluminium alloy ($E_s = 71 \text{ GPa}$, $\nu_s = 0.33$, $h_s = 8 \text{ mm}$) and the coating material is epoxy ($E_c = 3.3 \text{ GPa}$, $\nu_c = 0.37$ and $h_c = 3 \text{ mm}$)

11) Correction factor for plane stress loading is:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.80,1.20

1 point

12) Correction factor for a beam of 25 mm thickness:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.60,0.90

2 points

13) Correction factor for bending of plate

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.70,1.00

2 points