

Safe System of Work

Sample Preparation for Adhesive Strength Test

Overview

Torsion tests will be conducted on tubular specimens, formed by bonding together two steel tubes on their circular cross section. This gives pure shear in the adhesive.

This SSW describes the preparation of the samples. The steel tubes are each 33mm in diameter and 50mm long. Two types of epoxy adhesive are used: Sikadur 330, and Tyfo S. The materials safety data sheets (MSDS) for these adhesives can be found on the structures lab wiki, and should be read in conjunction with this SSW and the accompanying risk assessment.

Key Watchpoints



- Use of solvent during sample preparation and mixing of adhesive requires good ventilation and must avoid contact with skin (by PPE).
- Especial care must be taken to keep the area clean during mixing of and bonding using adhesive.
- Burns due to incorrect handling when curing the specimens at elevated temperature.

Required PPE

Safety boots, glasses, and gloves must be worn at all times during sample preparation.



Preparation of the steel tubes

1. The steel tubes are cut from standard stock. The bonding surface must be cleaned by grit blasting and solvent cleaning.
2. Grit blasting must only be carried out in the Sanderson workshop under the guidance of technical staff.
3. The ends of the tubes will be cleaned by wiping with acetone or IPA solvent. Gloves must be worn to avoid skin contact, and the work must take place in a well ventilated area, such as under the extraction hood in Fire Lab 2. The wipes can be disposed of via normal waste routes once they have dried. Users must also refer to the solvent MSDS.
4. The steel tubes must be kept in a sealed container with desiccant to remove moisture until they are ready to be bonded. Users must be familiar with the

MSDS for the desiccant.

Bonding of the steel tubes

5. Users must read and comply with the MSDS and instructions for the epoxy adhesive being used.
6. Mixing and applying epoxy adhesive can become messy. To avoid epoxy spreading, all necessary tools, PPE and equipment should be assembled before starting bonding. The work area should be protected using polythene sheet, and the top of weighing scales should be similarly protected. A supply of wipes, spare disposable gloves, and a waste container should be close at hand.
7. The epoxy adhesive must only be mixed in a well-ventilated area, for example, under the extraction hood in Fire Lab 2. The adhesive should be mixed according to the manufacturer's instructions (for at least 3 minutes until a uniform colour is achieved).
8. Care is required when bonding the specimens to achieve good alignment using the alignment rig.
9. All tools and the work area should be kept clean at all stages during the bonding operation to avoid spread of the adhesive.
10. At the end of the bonding operation, all tools must immediately be cleaned by solvent wipe. Spilt adhesive must be immediately cleared up (for example, by disposal of the polythene sheet). Adhesive can be disposed of via the normal waste route.

Curing of the specimens

11. The test samples must be cured under controlled temperature and relative humidity.
12. Temperature will be controlled by placing the samples in a drying oven (temperatures not more than 90°C). Care is required to avoid burns, and appropriate gloves will be required.
13. Relative humidity will be controlled by curing the samples in a container with a desiccant. The desiccant instructions and MSDS must be consulted by the user.
14. Periodic measurements will be made of temperature and %RH using a hand held electronic probe. Care should again be taken to avoid burns, and to avoid disturbing the cure environment.

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