Course R-015
Advanced Composite Automotive Structural Repair-2

Course Summary

This automotive-specific repair course is intended as a direct follow-on to our *R-14 Advanced Composite Automotive Structural Repair-1* course and is designed to meet the needs of repair technicians, mechanics, shop supervisors, inspectors, and any other personnel directly involved in providing high performance repairs to advanced composite automotive structures.

Introduction

This course exposes the student to much more challenging damage assessment and repair scenarios than those presented in the *R-14 Advanced Composite Automotive Structural Repair-1* course. Because of the complexity of the repairs and the advanced skills that are required, this course is only being offered to students that have graduated from our prerequisite R-14 repair course.

The class is almost all hands-on in nature, with students working in the repair shop, addressing larger and more complex repairs that require multi-step processes. Instruction will include discussions on various methods for recreating damaged-part surfaces, as well as actual fabrication of composite repair tools used to restore a complex- shape, thus allowing restoration of critical surfaces or features of the structure. Other alternative approaches to segment remove and replace repairs will be discussed and/or employed during the class to broaden the technician's overall options.

The student-teams will be subjected to realistic composite structural components that have sustained damage to large areas or complex features that will entail extensive evaluation and repair. The students will be tasked with creating an appropriate repair plan using standard repair procedures and creative processing schemes.

In addition, students will learn more about processing their repairs utilizing "hot-bonders" with heat blankets, heat lamps, infrared heaters, and hot-air machines. The students will learn the capabilities as well as the limitations of the different process equipment available to them within the industry. On-going experimentation with thermocouple placement and different heat-source equipment will be encouraged so that a working knowledge of these systems can be attained.

Repairs to composite fasteners/hole locations will also be addressed in this class. Methods for removal and replacement of fasteners and/or potted details in composite structures will be discussed including using the appropriate tools and techniques.

Topics

Key Lecture Topics:

- Advanced damage determination, assessment, and repair techniques.
- Segmented removal and replace repair approach.
- Developing and implementing a repair plan.
- Different types of repair tooling options.
- Recreating surface geometry using custom-fabricated repair tooling.
- Tool surface preparation; application of semi-permanent seal and release systems.
- Repair material and processing options, including the use of alternative heat sources.
- Fastener removal, repair, and replacement methods and techniques.

Workshop Exercises:

- Fabrication of composite repair tooling from original part surface.
- Damage assessment and removal of damage per repair plan.
- Multi-step repair of large-area damage on a complex composite structure.
- Curing repairs with various hot bonders and alternate heat sources.
- Post-repair evaluations and round-table inspection of all projects.

Course Benefits

Attendees will gain advanced level training and develop skills for performing large and more complex structural repairs to automotive composite structures that can immediately be put into practice in the workplace.

Prerequisites

R-14 Advanced Composite Automotive Structural Repair-1

Teaching Method

Active classroom lecture and workshop exercises

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