

# Automotive Body Repair

## Technical Handbook



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We would like to thank all of our industry leading sponsors that are passionate about finding the top talented apprentices and make this competition possible:



**CAR-O-LINER®**



This WorldSkills UK competition is managed by the Institute of the Motor Industry

## Overview:

Automotive Body Repair is a significant sector within the automotive engineering industry, automotive body repairs covers the accident/crash repair and or restoration of cars, trucks, or other vehicles. Automotive body repairs includes a wide range of skills, high standards and critical thinking and process applications and problem solving.

This guide will provide you with a clear path to follow, from the initial registration to the National finals and beyond.

## Career Pathway:

### What is the job role?

When cars, vans, motorcycles and larger vehicles are damaged in accidents, they are taken to a body repair workshop. Some repairers will complete the process from start to finish and others will have specialised roles and work on one part of the repair process. Panel technicians, also known as panel beaters or body repair technicians, specialise in repairing or replacing damaged panels. As a panel technician you will need to demonstrate: Strong communication skills, the ability to work alone and as part of a team, the ability to maintain quality under pressure an awareness of safety procedures, the ability to use specialist equipment, the ability to follow written and verbal instructions, good manual skills and a good eye for detail.

### Qualifications

You will need to have a good understanding of vehicle body and repair operations; you will be expected to be trained in body and paint operations in refinishing at level 2 for this level of work and then progress to body and paint operations at Level 3.

There are a range of qualifications such as N/SVQs and VRQs in vehicle body repair and paint operations in body repair.

You will need to have a good understanding of automotive systems and the specific materials required for a variety of repairs.

### Working hours and salary

You will normally work from 8am to 5pm Monday to Friday; however, you may be able to work overtime in the evenings and at weekends. You will usually work indoors in workshops or body shops and you will be expected to wear safety clothing when using specialised equipment and carrying out tasks such as welding. As an apprentice or a trainee panel technician you may earn between £7,000-£13,000 per year.

Once you are qualified the average Panel Beater/Body Repairer salary in United Kingdom is £30,000 per year or £15.38 per hour. Entry level positions start at £23,400 per year.

(Average salaries taken from <https://neuvoo.co.uk/salary/?job=panel+beater>)

### **Progression to:**

Senior Panel Technician, Vehicle Estimator/ Senior VDA, Bodyshop Manager.

### **For more Automotive career pathway information:**

<https://www.autocity.org.uk/>

## **Resources and Registration:**

For information and resources, including how to register, competition rules, and the steps to competing,

Visit:

<https://worldskillsuk.org/champions/national-skills-competitions/tools-and-resources>

## **Pre-competition Activity:**

Pre-competition competitors should try to familiarise themselves with competition style activities even if you have a fellow student to judge a completed work task during a practical session at college/training provider.

Also familiarise yourself with current industry processes and procedures for completing a range of tasks you may need to complete.

For information and resources, including a detailed Pre-Competition activity pack please find this on the WorldSkills UK Automotive Body Repair webpage.

## **Competition Structure:**

### **Registration:**

Once you have completed your registration (and accepted All terms and conditions) you will be emailed a link to complete a Passive online test.

### **Passive Stage:**

When the passive online test has been completed you will be notified to let you know if you have scored high enough to go through to the National Qualifiers (the practical competition rounds).

### **National Qualifiers Stage one:**

*The National Qualifier will be an online competition, all details would be emailed to you well in advance of any of the competitions.*

Ensure you're ready to compete in your National Qualifiers by looking at both the physical and online qualifier project briefs below.

These outline the type of tasks you will be expected to carry out. Ask your lecturer/employer for help in any areas where you feel you could improve and try to gain practical experience in all the task areas of the competition.

The Online National Qualifier consists of similar tasks to the practical competition that ran in previous years however the online task will be broken down into a series of online questions for you to answer.

The tasks outline the type of questions you will be expected to answer. Ask your lecturer/employer for help in any areas where you feel you could improve and try to use your practical experience in all the task areas to think about the different processes etc. that you could be questioned on for competition.

### **National Qualifier Stage two:**

Compete in your online National Qualifier. Details on how to join will be sent to you once you have passed the passive stage.

### **WorldSkills UK Live Final Stage one:**

The 6 highest scoring competitors across each National Qualifiers will be invited to compete at the finals - WorldSkills UK Live in November.

### **WorldSkills UK Live Final Stage two:**

Ensure you're ready to compete in your WorldSkills UK Live Final by looking at the project brief below.

This outlines the type of tasks you will be expected to carry out. Ask your lecturer/employer for help in any areas where you feel you could improve and try to gain practical experience in all the task areas of the competition.



Attend Pre final training arranged by IMI Skills Competitions (budget depending) and virtual online training.

### **WorldSkills UK Live Final Stage three:**

Attend and compete in your allocated WorldSkills UK Live Final.

## **Specification of the Practical Tasks :**

Tasks will be designed to test the competitors technical ability to:

- Read repair data sheets
- Follow correct procedures
- Work efficiently whilst minimising waste (time and materials)
- Prepare surfaces for repair
- Efficiently complete automotive welding
- Set up body repair equipment (checking for any faults)
- Apply body fillers materials
- Identify correct welding methods for body repair
- Accurately measure panels
- Measure vehicle body alignment
- Accurately rectify vehicle body misalignment
- Accurately use bonding materials
- Accurately assess any welding activity

## **Specification of the Online Tasks:**

Tasks will be designed to test the competitors technical ability to:

- Interpreting repair data sheets
- The importance of following correct procedures
- How to work efficiently whilst minimising waste (time and materials)
- Correct methods for prepare surfaces for repair
- The importance of efficiently complete automotive welding
- Correct set up body repair equipment (checking for any faults)
- How to apply body fillers materials
- Identify correct welding methods for body repair
- Procedures for accurately measure panels
- Methods of how to identify vehicle body alignment
- Identify how to rectify vehicle body misalignment
- Correct uses of bonding materials

- How and why we need to assess any welding activity

## Task Overview:

### National Qualifiers- Automotive Body Repair

#### Task A – Part Panel Replacement:

This task requires competitors to replace a section of a sill panel using a correct methods following industry standard techniques. The panel should be removed minimising any damage to the sill and a variety of welding industry standard techniques followed to replace the section.

#### Task B – MIG Welding:

Competitors will be required to check and set up the MIG welding equipment for each weld type. This will include gun tip, nozzle shield, power settings, wire type, speed, gas type and flow and correctly prepare sheet metal provided and complete a test weld and assess for strength and defects

The competitor will then carry out the following weld types:

- Horizontal Butt weld
- Slot weld – flat position, evenly spaced

Carry out a quality check on all finished welds and correctly shut down welding equipment on completion of task.

#### Task C – Panel Bonding:

The competitors will need to fit the supplied coupons together using bonding and riveting methods as per the sample provided.

#### Task D – Metal Finish Repair:

The competitors are required to use specialist metal finishing techniques to repair the damage to a steel panel. The finished repair should be ready to accept foundation materials.

#### Task E – Filler Repair:

The competitors are required to use specialist plastic body filler techniques to repair the damage to a steel panel a using no more than 2 fills. The finished repair should be ready to accept foundation materials.



## Marking and Assessment (Practical National Qualifier):

The WorldSkills UK/IMI Skills competitions provide an opportunity for automotive technicians to demonstrate the technical skills required to be a successful modern day technician.

For the practical qualifiers, competitors were required to work on a selection of panels carrying out various tasks, which will test the skills and abilities of a modern automotive body repair technician.

The competition consisted of 5 tasks lasting between 45 minutes and 2 hours each, designed to reflect the knowledge of vehicle Body Repair technicians working towards, or at, a level 3 vocational qualification.

The competition consisted mainly of carrying out a practical activity; tasks were (but were not limited to) any of the following:

Welding and brazing, whole panel replacement, part panel replacement, metal finish repairs, panel fill repairs, smart repairs, bonding and riveting, body realignment, workshop, measuring and marking out techniques.

Competitors were expected to demonstrate competence using hand tools, power tools, workshop equipment, measuring instruments, specialist tools and equipment.

Judges would have been looking for other skills expected of a successful technician such as time management, planning and problem solving skills.

All IMI Skills Competitions are judged by a panel of experts drawn from industry, colleges and training providers. The judges' decisions will be independently moderated and quality assured before results are confirmed. The judges will be briefed on assessment procedures prior to the competition.

Judges were looking for technical competency but were also briefed to look for excellence amongst competitors. Judges will therefore take into account skills such as

- Collect, analyse and organise information
- Communicate ideas and information
- Plan and organise work activities
- Use mathematical ideas and techniques
- Solve problems
- Use current technology
- Comply with H&S legislation

All task marking is objective and based on agreed criteria.

### National Qualifiers

Welding and brazing	30%
Bonding and riveting	15%
Part panel replacement	30%
Metal finish repairs	15%
Panel fill repairs	10%

### Marking and Assessment (Online National Qualifier):

The WorldSkills UK/IMI Skills competitions provide an opportunity for automotive technicians to demonstrate the technical knowledge and skills required to be a successful modern day technician.

Competitors are required to answer questions on a selection of virtual panels carrying out various tasks, which will test the knowledge and abilities of a modern automotive body repair technician.

The competition consists of 5 areas lasting between 45 minutes and 1 hours each, designed to reflect the knowledge of vehicle body repair technicians working towards, or at, a level 3 vocational qualification.

The competition consists mainly of answering questions on practical activities; tasks may be from (but are not limited to) any of the following:

Welding and brazing, whole panel replacement, part panel replacement, metal finish repairs, panel fill repairs, smart repairs, bonding and riveting, body realignment, workshop, measuring and marking out techniques.

Competitors will be expected to demonstrate competent knowledge in the using hand tools, power tools, workshop equipment, measuring instruments, specialist tools and equipment.

Judges will also be looking for other skills expected of a successful technician such as time management, planning and problem-solving skills.

All task marking is objective and based on agreed criteria.

### National Qualifiers

Welding and brazing	30%
Bonding and riveting	15%
Part panel replacement	30%
Metal finish repairs	15%
Panel fill repairs	10%

### National Qualifiers (Practical) What to expect:

In the past, the Automotive Refinishing National Qualifiers took place at the prestigious Nationwide Technical Training & Professional Development Academy in Goole.

The competitors would rotate around the five tasks over a full day of competition.

Task duration varied according to the complexity of the task, during which time competitors were required to apply industry recognised techniques and procedures to repair damaged panels and carry out body repair techniques *i.e* Various types of automotive welding and bonding techniques.

The competitors would have needed to show knowledge of the processes and equipment used for these operations.

### National Qualifiers (Online) What to expect:

The Automotive Body Repair Online National Qualifiers takes place remotely in the form of online/virtual tests.

You will be emailed a link and given a specific time to complete your online/virtual competition.

Task duration may vary according to the complexity of the task and the number of areas to be completed.

The competition will need to be accessed via laptop or P.C the digital competition maybe invigilated remotely by IMI staff and technical support will be available during the competition.

The competitors will need to show knowledge of the processes and equipment used for these operations.

## Task Overview:

### National Final- Automotive Body Repair

#### Task A – Structural Panel Replacement:

This task requires competitors to remove a quarter panel from a new vehicle body shell and replace with a new panel, the competitor will have 5 hours to complete this task. The competitor will have to follow the instructions and methods provided. The task is marked in sections and you must call the judge to mark your task at the identified points shown in the instructions.

#### Task B – Body Alignment:

Competitors will be required to set up measuring systems to enable vehicle body alignment measurements to be made, accurately measure and record vehicle body measurements against manufactures specifications using mechanical measuring system and accurately measure and record vehicle body measurements against manufactures specifications using electronic measuring system. Once the misalignment of vehicle body structure has been diagnosed, carry out corrective alignment procedure and provide printed evidence of final measurements after repair.

#### Task C – Braze, Bond and Rivet Panel:

The competitors will use a sill panel on the rig provided, remove a section to an exact given measurement which will include the removal of spot welds, using the new panel provided cut a section to replace the one you have removed and braze this into position. Various MIG brazed joints should be used as indicated on instruction sheet and bonding and riveting where instructed.

Care should be taken to ensure correct measurements and alignment is achieved.

#### Task D – Panel Pull and Filler Repair (Miracle Type System):

The competitors are required to use specialist dent pulling equipment techniques to repair the damage in the panel provided. The damage to a tolerance of 2mm (on the swage lines), ready to accept filler.

Repair the remaining damage on the panel provided using no more than 2 fills (excluding stopper).

The finished repair should be ready to accept foundation materials.

#### Task E – Metal Finish Repair:

The competitors are required to use specialist metal finishing techniques to repair the damage to a steel panel. The finished repair should be ready to accept foundation materials.

### **Task F – Plastic Weld Repair:**

The competitors will assess the panel provided for damage, use the plastic welding equipment provided to repair any damage identified, the competitor will carry out twist test on completion of repair.

### **Marking and Assessment:**

The marking scheme is designed to fairly compare every competitor's work.

The marking is split between specific judgement aspects throughout the task, including efficiency, health and safety and technical performance.

The IMI Skills competitions are judged by a panel of industry specialists.

The judges' decisions will be independently moderated and quality assured before being confirmed at the closing ceremony where the results are announced. The judges are briefed on assessment procedures prior to the competition.

Judges are looking for technical competency but are also briefed to look for excellence amongst competitors. Judges will therefore take into account skills such as time management, working under pressure and communication skills. All marking is objective and based on agreed criteria.

The competitors will be required to be competent in the set up and use of welding equipment and vehicle body misalignment equipment, specialist dent removal equipment and be competent in panel beating techniques. Judges will also be looking for other skills expected of a successful technician, such as time management, planning and problem solving skills.

Competitors are required to carry out practical activities and apply industry approved standards using equipment, techniques and materials associated with accident repairs e.g. body realignment measuring systems and jigs, welding equipment (including plastic welding), specialist air and hand tools commonly used in the repair of vehicle bodywork, filler products and smart repair equipment as well as compliance with all Health & Safety legislation.

The tasks at the UK LIVE final follow a similar format to those at the qualifiers but are of a more complex nature requiring an in depth knowledge of repair procedures, techniques, materials and equipment.

You will be required to be competent in the set up and use of MIG welding equipment, MAG welding equipment and resistance spot welding equipment, vehicle measuring equipment,

vehicle misalignment rectification equipment, dent pulling systems, plastic welding equipment and panel beating tools.

Judges will also be looking for other skills expected of a successful technician, such as:-

- Efficiency
- Time Management
- Performance when working under pressure
- Communication skills
- Effective Planning
- Collect, analyse and organise information
- Communicate ideas and information
- Plan and organise work activities
- Use mathematical ideas and techniques
- Solve problems
- Use current technology

All competitors will receive feedback after the competition on their performance. The allocation of marks is dependent on the tasks chosen and their complexity.

Below is a broad outline of how marks may be distributed:

**National final:**

Part panel replacement	40%
Vehicle body realignment	15%
Welding/Brazing/Bonding/Riveting	15%
Metal finish repair	10%
Smart/Filler repair	10%
Plastic weld repair	10%

**Judges Top Tips:**

- Preparation and Practice  
A successful competitor you need to be confident, calm and self-assured when competing.  
Prepare by practicing your skills and techniques to ensure you get the required standard/results you want without any surprises.
- Time Management  
Learn to manage your time effectively when completing tasks by working smart not fast!



The tasks have allocated times, so practice working to time and under pressure to perfect your timing.

If you run out of time in the competition you will lose marks.

- **Planning**  
Make your own plans for how to complete each task, work methodically and even write it down to help you prepare.
- **Organised**  
Make sure you are organised, make sure all stages of a task are completed.  
Organise all of your equipment and materials for the task.
- **Health & Safety**  
In any automotive refinishing environment Health & Safety is very important, make sure you use the appropriate PPE for the task and work safely.
- **Clean and Tidy**  
Keep your working area tidy as you can be more efficient in a tidy work area. Make sure that when you present your work to the judges it is clean and ready for final judging.
- **Understanding**  
Read the task brief thoroughly and make sure you understand what you need to do. Do not be afraid to ask questions, remember there is only one silly question.....the one you don't ask!
- **Don't Worry**  
If a part of a task hasn't gone as well as you might have wanted don't worry or dwell on it, just draw a line under that and get on with the next task. Always focus on the marks you can gain not what you might have lost.
- **Enjoy**  
To get to the WorldSkills UK National Qualifiers or the WorldSkills UK Live National Finals is in its self a massive achievement that you should be extremely proud of! Make the most of the whole WorldSkills UK/IMI Skills Competitions process and enjoy it!

### **National Final - Automotive Body Repair What to expect:**

The competitors rotate around the six tasks above over the two days (Thursday and Friday) of competition.

Task duration varies according to the complexity of the task, during which time they will be required to apply industry recognised techniques and procedures to replace a range of panels/sections and repair damaged to panels with a variety of different panel substrates.

The competitors will need to show knowledge of the equipment used in these processes and be able to follow the correct industry recognised process for each task. The tasks are designed to assess the knowledge and skills of technicians working towards, or at, a level 3 vehicle Body Repair vocational qualification as a minimum

A period of familiarisation and training is scheduled (Wednesday) to allow you to become acquainted with the tools, materials and equipment you will use during the competition and the tasks to be completed.

Use this time to ensure you are confident in the use of application of all the equipment you will use.

### **Saturday activity: Automotive Body Repair**

The Saturday showcase activity gives you a chance to become the trainer and to show your skills to the public and visitors without the pressure of the competition.

On the Saturday each body repair finalist will each be the trainer/judge and man the “Have a Go” on the competition stand to provide the visitors with a hands on experience of the automotive body repair industry.

## **Training for the National Finals:**

IMI Skills Competitions will invite the finalists to a training event at Car-o-liner at their UK training centre in Rugby\* and virtual training from 3M and Proworx. This is an excellent opportunity for all competitors to boost their confidence using the equipment in a safe environment, while replicating the competition tasks and expectations.

The Training will cover:

- Specific product training
- Latest techniques
- Metal finish training
- Process training
- Using Car-o-liner welding equipment
- Using Car-o-liner body realignment equipment
- Using Car-o-liner measuring equipment
- How to use the products efficiently

*\*Live training events at Car-o-liner's training centre are dependent on funding/budget\**

## Digital Resources:

Useful product information and "How to" guides can be gained at our sponsor suppliers websites.

- <https://car-o-liner.com/>
- <https://www.youtube.com/user/CarOLinerAuto>
- <https://www.youtube.com/watch?v=g3jg28x2Y6Y>
- <https://www.youtube.com/playlist?list=PLe6WCqQLa3q-9fj1JtPSem6PqfOw36Sfb>
- <https://www.youtube.com/playlist?list=PLe6WCqQLa3q8FFt6lPlp7mg24dYacCgXr>
- <https://www.youtube.com/playlist?list=PLe6WCqQLa3q8PYrxrP5rOQcloMCOkHeAY>
- <https://www.youtube.com/user/3MAutoBodyRepair>
- [https://www.3m.co.uk/3M/en\\_GB/collision-repair-uk/](https://www.3m.co.uk/3M/en_GB/collision-repair-uk/)
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- <https://www.proworx.eu/body-filler-product/>
- <https://morelli.co.uk/group>
- <https://www.theimi.org.uk/landing/skillauto/>
- <https://tide.theimi.org.uk/>
- <https://student.theimi.org.uk/competitions>

## Competition Rules:

Conduct for competitors during live competitions:

- It is the competitor's responsibility to arrive on time at the event each day, late arrivals may be excluded from the competition.
- The IMI will provide accommodation for you from the Wednesday to the Sunday.
- Competitors will start and finish tasks as instructed by the judges or Competition team.
- Equipment, tools and specific safety equipment will be supplied; however competitors are required to wear the Skill Auto uniforms supplied. Please bring own safety shoes. (Without your safety shoes you may not be able to take part in the competition due to health and safety regulations)
- Any competitor who wishes to leave the area during the competition must seek the permission of the competition organisers or lead judge.
- If there is a power stoppage, breakdown of machinery or accident, the competitors must act according to the instructions of the competition organisers.

- Competitors are expected to comply with the host venue rules and regulations.
- Between tasks competitors will wait in the designated area until directed to their next task by a judge.

## Beyond the National Finals:

*Please note, the 2021 competition is not a selection year for the EuroSkills or International Competitions.*

The WorldSkills UK/IMI Skills Competitions national finals sometimes form part of the selection process for WorldSkills International competitions.

WorldSkills International training managers will be onsite during the competition, monitoring the performance of those who are age eligible for Lyon and Age-eligible competitors who show the highest skills, passion, and drive to compete could be invited to train for the EuroSkills and WorldSkills international competitions.

Further details of the international competitions including eligibility criteria can be found on the WorldSkills International website [www.worldskills.org](http://www.worldskills.org) You will be notified if you are age eligible.

Those who are not eligible for international competitions may join the Champions programme, which allows continued involvement, including the opportunity to work with WorldSkills UK and visit schools, colleges, and events to inspire the next generations.

Alternatively, if training is of interest to you, you could consider supporting WorldSkills UK with organising and training, and even helping to run the National finals.

Get inspired and you could become part of Team UK!

