

Ensuring Safety

Best Practices for the Maintenance
and Repair of Legacy Bridge Parapets



Bridge parapets are critical components of road infrastructure, designed to safeguard lives by preventing vehicles from leaving the bridge structure. Over time, however, these barriers can degrade due to environmental exposure, impact damage, and the natural aging of materials. For legacy parapet systems – many of which were installed before modern dynamic testing standards were introduced – routine maintenance and accurate repairs are essential to ensure ongoing reliability and compliance with safety standards.

Yet, industry practices often fall short of this goal. In the absence of strict requirements for certified repairs, parapet maintenance is sometimes carried out by unapproved contractors who may lack the technical knowledge and access to original specifications

needed for safe, like-for-like replacements.

This gap in industry practice not only increases the risk of compromised parapet performance but also introduces significant liability concerns in the event of an accident.

Below, we'll outline some best practices for bridge parapet maintenance and repair, highlighting the importance of adhering to national standards and working with accredited professionals. By exploring the legal requirements, specific challenges of legacy systems, and the role of qualified manufacturers, we aim to provide a framework that supports safety and compliance across the UK's road network.



Legal Requirements and Standards for Parapet Maintenance and Repair

When bridge parapets require maintenance or repair, adherence to both legal and industry standards is crucial to ensure safety and compliance.

According to the Specification for Highways Works (MCHW, Series 400), components used in parapet repairs must match the performance characteristics of the existing parapet. This requirement stipulates that replacements be of an identical design, detail, specification, and geometry as the originally installed components, creating a like-for-like repair.

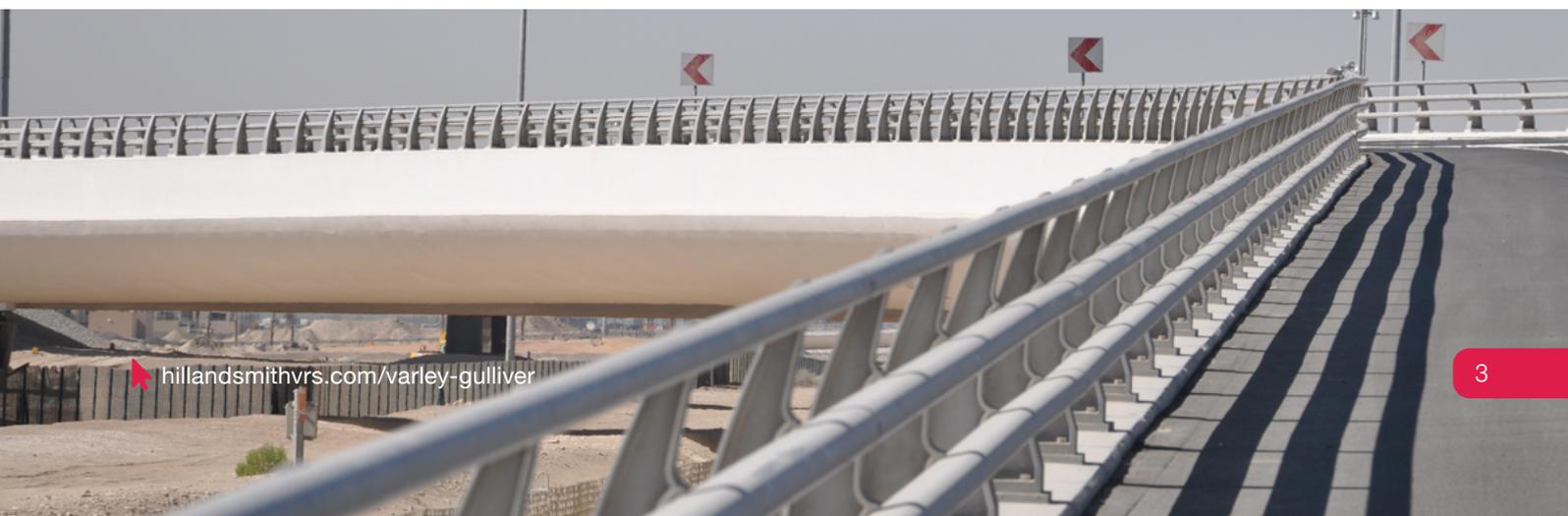
This specification is intended to maintain the structural integrity and original performance standards of parapet systems, which are often unique and may incorporate bespoke designs.

In addition to these specifications, the National Highways Sector Scheme (NHSS) mandates that any service provider involved in parapet repair work must be appropriately certified. Registration under the NHSS

is required for all companies supplying maintenance or repair services on the national road network, with this certification acting as a baseline for ensuring competency, quality, and adherence to legal standards. NHSS certification brings a range of advantages, including visibility on the Schedule of Suppliers, making it easier for certified businesses to tender for national contracts and signalling to clients a commitment to high safety and quality standards.

In cases where a parapet was installed before the 1972 introduction of dynamic testing standards, achieving an exact match in materials can be challenging due to the evolution of industry standards and the transition from imperial to metric measurements. In such cases, best practice dictates that the closest metric equivalent to the original material should be used, provided it meets comparable strength and performance characteristics.

By enforcing a like-for-like replacement and requiring certification under NHSS, the industry ensures that repairs meet established safety thresholds and maintain the functional integrity of critical infrastructure. These standards help mitigate risks associated with substandard repairs, including potential failures in the event of an accident.





The Challenges of Maintaining Bespoke and Legacy Systems

Bridge parapets installed before 1972 present unique challenges in maintenance and repair. These legacy systems often involve bespoke designs tailored to specific bridge structures, using materials and

construction methods that may no longer be standard. As a result, repairs to these older parapets require careful consideration to ensure safety, compatibility, and compliance with current standards.

Steel	
British Steel	Manufactured for 40 years
Aluminium	
AHDE, ALCAN, Almetex, BAL, HDA & HDE	One of only two licensees for 40 years
BACO	Acquired Intellectual Property in 2000
Phoenix	Small Usage
Grundy	Small Usage

Types of legacy systems installed.

One of the key issues in maintaining legacy parapets is sourcing materials and components that match the original specifications. Over time, certain materials – especially those originally manufactured to imperial measurements – have become difficult to procure. Whilst using the closest metric equivalent is an option, even minor variations can impact the parapet's ability to perform as intended, especially under dynamic impact conditions. That's why it's essential to work with specialists who have a deep understanding of both the legacy systems and current engineering requirements.

Another challenge is the inherent degradation of older parapets over decades of exposure to environmental stressors. Legacy parapets are particularly susceptible to issues such as corrosion of base plates, internal material degradation, and the entrapment of hydrogen gas – all of which can compromise their structural integrity. Regular inspections are vital for identifying these vulnerabilities, but in many cases, road authorities lack the specific expertise required to assess the condition of these niche structures accurately. Without thorough and informed inspections, there is a risk that hidden damage or wear could go unnoticed until a failure occurs.



The Importance of Regular Inspections and Maintenance

Under current guidelines from National Highways, parapets should undergo inspections every two years, but adherence to this biannual schedule is not always consistent.

Inspections serve a dual purpose: identifying damage from accidents and pinpointing gradual wear or issues caused by environmental exposure.

Each road authority holds responsibility for the condition of parapets within their jurisdiction, and this includes scheduling and funding necessary inspections. However, conducting a thorough

inspection of a bridge parapet is a complex task that often requires expertise beyond standard engineering knowledge.

Beyond addressing accidental damage, routine maintenance is vital for detecting less obvious forms of degradation, such as corrosion, hydrogen gas entrapment, and internal structural weaknesses. In some cases, issues may originate from substandard installation practices or the use of incompatible replacement parts. For example, missing bolts, corrosion on underside base plates, or slight misalignments can affect the overall integrity of the parapet.

The Importance of Using Accredited Organisations

Given these complexities, ensuring that any maintenance or repair work on legacy parapets is carried out by accredited professionals is not only a best practice but also a matter of public safety.

Bridge parapets are specialised components within road infrastructure, and their repair and maintenance demand an in-depth understanding of both the specific parapet design and the stringent safety requirements that govern their performance. Accredited organisations, particularly those that hold certifications such as Fencing Industry Skills Scheme (FISS) and National Highways Sector Schemes (NHSS) 5A and 10B, bring this level of expertise to every repair.

NHSS 5A controls the manufacturing of parapets, while NHSS 10B governs the installation of vehicle restraint systems (VRS), which includes parapets. These certifications signify that the organisation has the necessary knowledge and qualifications to work with niche products like bridge parapets and follow industry best practices.

When repairs and maintenance are carried out by non-accredited or inadequately qualified providers, the risk of substandard workmanship increases significantly. Without the correct training and access to original specifications, unapproved providers may inadvertently use incompatible parts or fail to meet precise installation requirements, leading to compromised parapet performance. In the event of an impact, even

a slight deviation from the original specifications could prevent the parapet from performing as intended, increasing the likelihood of severe consequences.

Moreover, accredited organisations follow strict protocols to ensure like-for-like replacements, as outlined in industry standards. This means using components identical in design, specification, and geometry to those originally installed, preserving the parapet's ability to perform as originally intended. Accredited organisations also keep detailed records of each project, providing traceability and accountability in the event of future inspections or investigations.

Choosing an accredited organisation for parapet maintenance and repairs ensures that the work is done to the highest safety standards, minimising risk to the public and reducing liability for road authorities. These certified professionals are trained to handle the unique challenges posed by parapet systems – including bespoke and legacy designs – and to make informed decisions about materials, installation methods, and maintenance requirements.



Required Accreditations and Qualifications for Maintenance Personnel

To ensure bridge parapet repairs and maintenance meet high safety and performance standards, personnel working on these structures must hold specific qualifications and accreditations.

Key certifications, such as those issued by the FISS and compliance with NHSS 10B requirements, verify that workers are proficient in the technical aspects of their tasks and the specific protocols for parapet systems.

Additionally, trained installers understand the importance of using components that meet NHSS 5A manufacturing standards (or similar), ensuring that only high-quality, compliant products are used in repairs. This level of training ensures that maintenance personnel can deliver precise repairs that align with the original design and safety expectations.

In addition to general industry accreditations, maintenance personnel should undergo product-specific training for each type of parapet they are responsible for maintaining.

This training includes in-depth instruction on the exact design, materials, and installation techniques required for each system, ensuring that repairs meet the like-for-like standards essential for parapet functionality. For

instance, training may cover details like the specific types of bolts, anchors, and materials needed to match the original specifications, which is especially critical for legacy systems that require precise replacements.

Furthermore, each worker must carry a FISS/CSCS blue card, which confirms their skills, qualifications, and safety awareness for work on parapet systems. This card, often required for site access, indicates that the holder has undergone rigorous training and is competent to perform the specialised tasks required. For complex or bespoke parapet systems, additional training modules may be necessary to address unique requirements, such as adapting to structural variations or managing installation under challenging site conditions.



Detailed Site Surveys: Essential Steps for Effective Maintenance

A comprehensive site survey involves several key steps. First, the maintenance team identifies the parapet system in place, as not all systems are immediately recognisable, especially those custom-designed or installed many decades ago.

Accurate identification is essential to ensure that any replacement components or repair techniques align with the original system's design and performance criteria.

The survey also examines the condition of the parapet, checking for visible damage, such as dents or cracks from previous impacts, as well as subtler issues like corrosion, hydrogen gas entrapment, or internal degradation.



Examples of identification tags on legacy systems.

Additionally, the site survey includes an assessment of the parapet's anchorage system, a critical component for structural integrity. Certain systems may use older or substandard anchoring methods that require updating to meet current safety standards. For example, the presence of tigger bolts – a previously used anchoring type that is now recognised as substandard – would prompt the maintenance team to recommend alternative anchorage solutions that meet current standards and improve the parapet's reliability.

In cases where the survey is prompted by an accident, the team also assesses the extent of damage to the parapet and evaluates the materials needed for an exact like-for-like replacement. This level of detail enables the maintenance provider to compile a precise scope of work that minimises the risk of future failures.

Comprehensive site surveys not only support effective and targeted maintenance but also provide critical documentation for ongoing asset management.

With accurate, up-to-date information about each parapet's condition, road authorities can make informed decisions about future maintenance needs and budget allocations, ensuring that these essential safety barriers continue to protect the public effectively.

GENERAL DETAILS:							
Concractor		Structure Name / Location		Survey By		Date	
BRIDGE / PARAPET DETAILS:							
Beam Width		Beam Depth		Up Stand	Parapet Type		If other, please state
Bolt Size	Front Bolt to Front of Beam		Connector to Barrier		Infill	Infill Size	Special?
Painted	Colour						
JOINT DETAILS:							
Standard							
End - 1	1 - 2	2 - 3	3 - 4	4 - 5	Joint Gap	Bolt Size	
Expansion							
End - 1	1 - 2	2 - 3	3 - 4	4 - 5	Joint Gap	Bolt Size	
							
(Measurement in brackets)							
TRAFFIC MANAGEMENT:							
Traffic Management Under Bridge			Traffic Management On Bridge			Other	
GENERAL NOTES:							
<div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); opacity: 0.3; font-size: 100px; pointer-events: none;">EXAMPLE</div>					Scheme Details		
					<input type="checkbox"/>	Repair	
					<input type="checkbox"/>	Refurbishment	
					<input type="checkbox"/>	New Build	

Example of Site Survey Sheet



Transition to modern VRS

Benefits of Engaging an Accredited Company for Maintenance

Engaging an accredited company for the maintenance and repair of bridge parapets offers several crucial benefits, particularly for legacy products and bespoke systems.

Accredited companies bring a deep understanding of industry standards, specialised knowledge of legacy systems, and a commitment to quality and compliance.

By leveraging their expertise, road authorities and infrastructure owners can ensure that parapet systems meet safety expectations, even as these systems age.

One key benefit of working with an accredited company is the ability to implement engineered solutions for transitioning legacy parapets into modern VRS.

Many older parapets lack the necessary connections to integrate seamlessly with VRS, which can leave gaps in safety standards. Accredited maintenance providers can develop tailored, engineered solutions that allow

these parapets to transition into modern systems, improving their performance and compliance with current safety guidelines. This added layer of engineering provides an extra level of protection for road users and enhances the overall resilience of the infrastructure.

Additionally, accredited companies are well-versed in like-for-like repair practices, ensuring that replacement components match the original specifications in terms of material, design, and geometry. This precise approach helps maintain the structural integrity and functionality of the parapet, reducing the risk of failure during an impact. Using compatible parts not only preserves the parapet's original performance characteristics but also aligns with the legal and industry requirements for legacy systems, reinforcing the safety of the repair work.

Accredited companies also offer valuable documentation and traceability for each repair or maintenance project. This documentation provides a detailed record of the parapet's condition, the repairs undertaken, and the materials used, which can be invaluable for future inspections, audits, or investigations. With this documentation in place, road authorities can demonstrate compliance with safety regulations and industry best practices, protecting themselves against potential liabilities.

Building a Legacy of Safety: Striving for Excellence in Parapet Maintenance

Ensuring the long-term safety and effectiveness of bridge parapets requires more than just routine maintenance – it demands a comprehensive understanding of each asset and a commitment to best practices. For everyone involved in the management, repair, and upkeep of these critical structures, there is an obligation to approach each project with precision, using accredited specialists and adhering to industry standards. Legacy and bespoke parapets, in particular, require expert attention to ensure they continue to perform as intended.

By striving for a thorough knowledge of the parapet systems under their care and committing to rigorous, expert-led maintenance, road authorities and infrastructure managers can safeguard these assets effectively. Taking this proactive, informed approach to repair, maintenance, and improvement not only aligns with regulatory requirements but also supports a safer, more resilient infrastructure that protects the public for years to come.





 01902 499 400

 sales@varleys.co.uk

 hillandsmithvrs.com/varley-gulliver