

ISSUE DETAILS

Reference	P&E/348	Issue No.	1	Issue Date:	Oct 2006
Title	Use of Wacker Plates				
Status	Revised				
Compliance Date	Immediate				
Document Owner	Paul Milner – Engineering Manager				

BRIEFING REQUIREMENTS

The following table defines how revised issues of this document are briefed to existing employees according to related specific responsibilities.

This is determined using the 'RACI' principle. Those roles identified as 'Responsible' and 'Accountable' should receive a formal awareness briefing facilitated by the Document Owner.

Role	RACI	Type of briefing
Plant Coordinator	Informed	Awareness
Plant Development Engineer	Responsible	Detailed
Reliability Engineer - OTM	Responsible	Detailed
Operations Coordinator - OTM	Informed	Awareness
Temporary Route Learning Coordinator	Informed	Awareness
Bowser Driver	Informed	Awareness
Senior Bowser Driver	Informed	Awareness
Senior Driver Maintainer Operator	Responsible	Detailed
Trainee Driver Maintainer Operator	Responsible	Detailed
Driver Maintainer Operator	Responsible	Detailed
Driver Operator	Informed	Awareness
Fitter / Fitter Small Plant - NVQ	Informed	Awareness
Maintainer Operator OTM/PM	Responsible	Detailed
Maintainer Operator RMC	Informed	Awareness
Trainee Maintainer Operator	Responsible	Detailed
OTM Operator	Informed	Awareness
Plant Operator PM	Informed	Awareness
Crew Manager OTM	Responsible	Detailed
Delivery Supervisor	Informed	Awareness

PURPOSE

This instruction sets out the safe methods to be adopted when using ballast compaction equipment. Correct use of machinery and/or techniques is a fundamental requirement of delivering the necessary track quality. Incorrect use is unsafe, unacceptable and will lead to personal injury or damage to infrastructure sites, components and equipment. Most importantly, failure to undertake compaction correctly can result in rapid deterioration of track leading to Emergency Speed Restrictions and high risk.

Where it is necessary to carry out a process which requires the use of tools or equipment, then only persons who have been trained and who hold a current VolkerRail certificate of competence may undertake that work.

SCOPE

This instruction is mandatory. It applies to all ballast compaction operations undertaken on VolkerRail work sites and other operations where VolkerRail are working as a subcontractor on sites in the custody of "others". It does not cover sites with live 3rd or 4th rails.

WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY

This is the first issue of a new standard


ISSUE RECORD

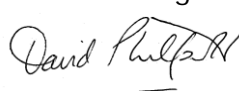
Issue No.	Date	Summary of changes
1	Oct 2006	First Issue

Use of Wacker Plates

Approval and Authorisation

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Technology & Innovations Manager

Agreed by:

Business Engineer, National Renewals

Authorised by:

Director of Engineering

Revision Details

Issue No.	Revision No.	Issue date	Comments
1	0	Oct 2006	First Issue

Use of Wacker Plates

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Use of Wacker Plates

1. Introduction

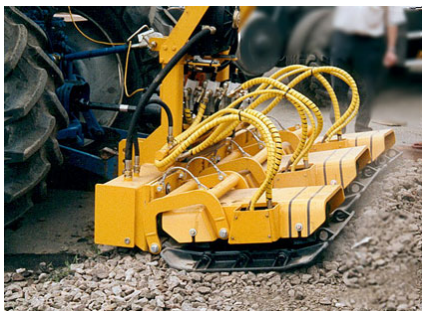
This instruction sets out the safe methods to be adopted when using ballast compaction equipment. Correct use of machinery and/or techniques is a fundamental requirement of delivering the necessary track quality. Incorrect use is unsafe, unacceptable and will lead to personal injury or damage to infrastructure sites, components and equipment. Most importantly, failure to undertake compaction correctly can result in rapid deterioration of track leading to Emergency Speed Restrictions and high risk. Where it is necessary to carry out a process which requires the use of tools or equipment, then only persons who have been trained and who hold a current VolkerRail certificate of competence may undertake that work

2. Scope

This instruction is mandatory. It applies to all ballast compaction operations undertaken on VolkerRail work sites and other operations where VolkerRail are working as a subcontractor on sites in the custody of "others". It does not cover sites with live 3rd or 4th rails.

3. Types of Equipment

The equipment below are slightly different in vibration frequency and centrifugal force so therefore require a different amount of passes to achieve the required compaction.



Boschung Plate on rear of Tractor



DPU 6055/86



DPU 100/70

4. General Considerations

4.1. Installation Quality

The quality of the ballast compaction will have an effect on the life of the installation and the amount of maintenance needed. This is extremely important as S&C layouts installed on a ballast bed which does not have a uniform depth of ballast throughout the installation cannot possibly be expected to achieve a uniform degree of ballast consolidation.

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4.2. Compaction

NR/SP/TRK/102 requires, in some cases, ballast to be compacted in layers. (See sections 4.2 and 5.2).

NR/SP/TRK/9039 states "This should be done (except over structures) using at least four passes of a 1400-1800kg/m² vibrating plate compactor or equivalent. No pneumatic tyred vehicle should be permitted to run on a ballasted layer after compaction."

If compaction is carried out in this manner will it assist in maintaining track geometry within the tolerances required for achievement of NR/SP/TRK/102 Track Quality Standard and removal of speed restrictions.

4.3. Structures

When compaction is required over structures, the **Project Manager** must ensure trial holes are taken to establish the depth of ballast and then a decision made on what type of equipment to be used. If there is any doubt then advice should be sought from either **Structures Engineer Business Engineer** or **Director of Engineering**.

4.4. Lifting Beams

Lifting beams attached to the machines for the purpose of craning into and out of site shall always be removed for the compaction operation. Inadequate compaction, excessive noise and vibration and damage to the equipment will result if this is not done.

4.5. Achievement

It is the responsibility of the **Project Manager** through the Method Statements and staff to ensure that the required amount of compaction is achieved.

5. Procedure

5.1. Robust Plan

Project Managers shall ensure a robust plan is in place for safe access and egress to the worksite for the compaction equipment between tasks so there is no damage to the infrastructure and all lifting plans are produced by competent crane planners as per GEI/P&E/326 and GEI/P&E/327.

5.2. Ballast bed

The ballast bed should ideally be laid in layers not exceeding 150mm deep and each layer should be compacted uniformly, according to Client specification.

Where Client does not specify this, layers up to 300mm thick (maximum) may be used but greater settlement will occur under traffic which may necessitate a lower Temporary Speed Restriction (TSR).

5.3. Number of Passes

The required number of passes to achieve the correct compaction is essential; a centrifugal force of 180kN and an ideal frequency of 69Hz ensures compaction is achieved in 3 passes. (Wacker Triple DPU 6086 accomplishes this).

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It should be noted that NR/SP/TRK 9039 requires 4 passes, but does not require a specific force or frequency. On Network Rail Infrastructure, the **Project Manager** must therefore obtain agreement from the Client's technical representative that 3 passes is sufficient or seek a Technical Non Compliance (TNC) for this. The TNC shall be sought from the Client via the **Business Engineering Manager** who should also be copied into any other formal agreement.

5.4. Boschung Plate on Tractor

This device shall only be used where Client standards permit the use of wheeled vehicles on cut formation and newly placed ballast.

6. Specific Safety Requirements

The wearing of personal protective equipment by staff involved in these activities is mandatory with the addition of gloves and ear protection.

6.1. Risks

Risk	Mitigation
Hearing damage	Wear ear defenders
Finger damage	Use of vibration reducing gloves
Toe damage	Safety footwear
Rail & trackside equipment damage	Take care to keep to the confines of the working area.

6.2. HAVS (Hand Arm Vibration Syndrome/Repetitive Strain Injury/Vibration White Finger)

Hand arm vibration syndrome (HAVS) is caused by exposure of the hands to excess levels of vibration from hand held power tools. The most common form of HAVS is vibration white finger (VWF), which is caused by damage to the blood circulation and characterised by whitening and numbness in the fingers. The key legal duties in relation to HAVS include general responsibilities, under the Health and Safety at Work etc Act, on employers to minimise risks to their employees. The Management of Health and Safety at Work Regulations require employers to make a suitable and sufficient assessment of the risk to health (including HAVS) and to make suitable arrangements to control these risks. The immediate risks of HAVS come from the level of vibration and the duration of exposure to the vibration source both in terms of hours per day and years of work. Hand transmitted vibration is expressed in terms of the acceleration of the equipment in contact with the hand and is normally given in metres per second squared (m/s^2). An operative's daily vibration exposure therefore depends upon this measure of vibration and the length of time an employee is exposed. HSE recommend an 'action' level of $2.8m/s^2$ averaged over an eight hour day (expressed as $2.8m/s^2$ but suggest that such exposure should be reduced to as low as is reasonably practicable.

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The risk of exposure to HAVS can be totally eradicated in the compaction process by using Remote Controlled Triple Wacker Compaction (RCTW) devices and this is the only recommended process on all VolkerRail worksites on all infrastructure.

Should RCTW devices not be available the **Project Manager** shall establish permitted exposure limits and deviations with the HSQE Manager and mandate these through the Method Statement.

It is the responsibility of the **Project Manager** to ensure that these objectives are met through implementing best practice through Method Statements and briefings.

7. Training, Competency and Certification

All staff using ballast compaction equipment must be trained and competent to use the specific equipment provided and must be in possession of the appropriate certification. This must be available on site for inspection.

Project Managers shall ensure through their managers and supervisors that only certified staff are used for this task.

8. References/Cross references/Further Information

RT/CE/S/006 - Track Ballast & Stoneblower Aggregate

NR/SP/TRK/102 - Track Construction Standards

NR/SP/TRK/9039 – Formation Treatments

GEI/P&E/348

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Triple Wacker Compaction Trials Appendix A

Triple Wacker Compaction Trials

Likely compaction to be achieved on site. (Results from Tests at Frodingham April & June 2006, evidence retained by Engineering Director on file with this Instruction).

Machine	2 x 150 layers Average compaction achieved (mm)			1 x 300 layer Average compaction achieved (mm)
	1 st Layer	2 nd Layer	Total	Total
100/70 Remote Controlled Triple Wacker	4 passes	4 passes	4 passes	4 passes
	31	21	52	45
	3 passes	3 passes	3 passes	3 passes
	30	19	49	41
6055 Manually Controlled Triple Wacker	4 passes	4 passes	4 passes	4 passes
	29	19	48	42
	3 passes	3 passes	3 passes	3 passes
	27	18	45	40