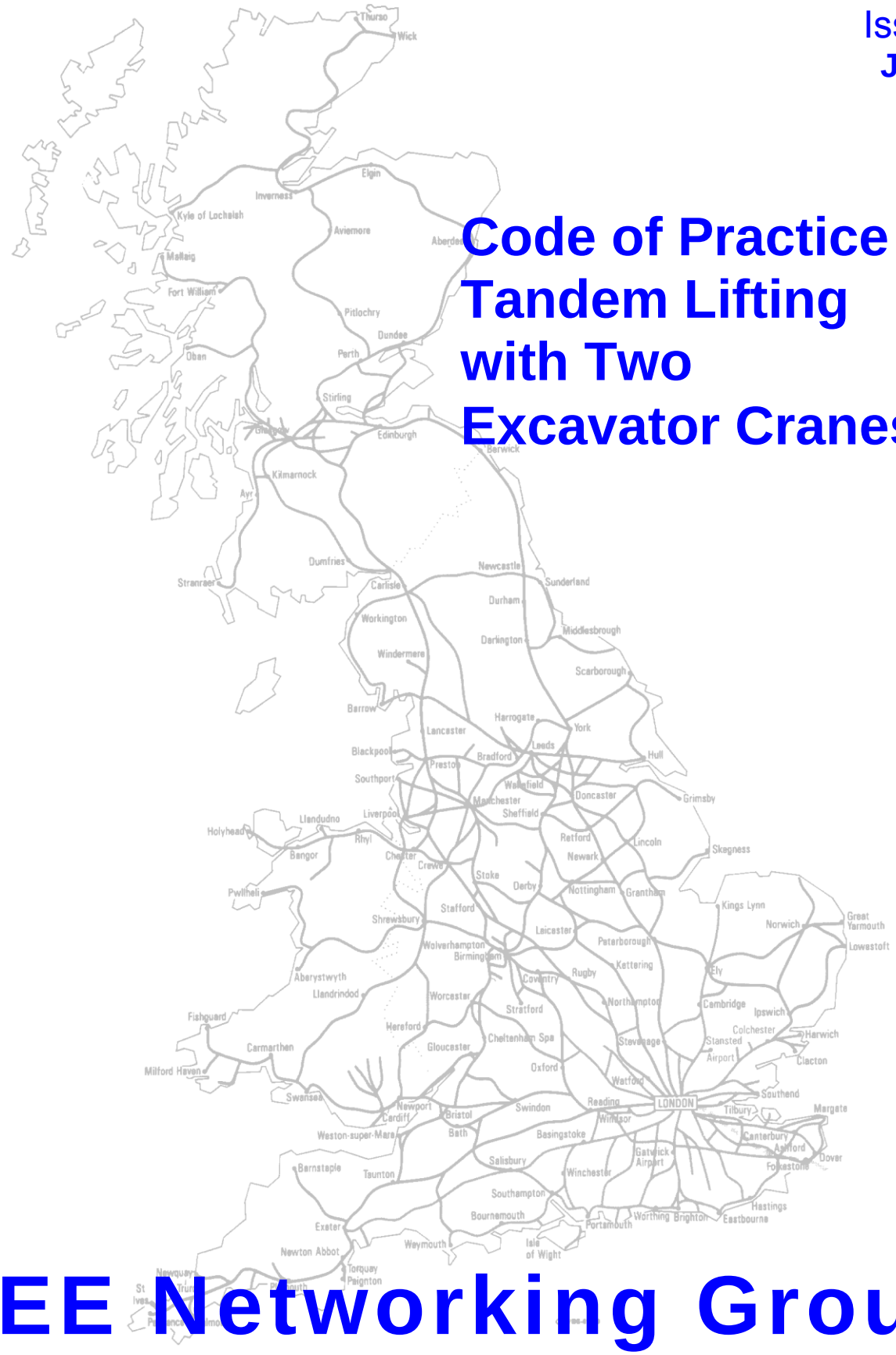
COP0008
Issue 4
Jan 11

Code of Practice for Tandem Lifting with Two Excavator Cranes



M&EE Networking Group

Document revision history

Issue	Date	Reason for change
1	Mar 01	First issue (now withdrawn)
2	Jul 07	Method of working with two excavator cranes researched by M&EE Technical Group and findings amalgamated in Issue 2 which has also been reviewed. (now withdrawn)
3	Apr 10	Amended to remove red/green label and include 'tandem mode' of RCI; document re-issued
4	Jan 11	Amended as a result of failures of panel grab bolts by the inclusion of new clause about use of panel grabs

Background

A sub-group of the M & EE Networking Group have looked at the arrangements for tandem lifting with excavator cranes and recommend the following as good practice for the industry.

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Sign off

The M & EE Networking Group agreed and signed off this Code of Practice on 19 January 2011 and published on 5 March 2011.

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Purpose

This Code of Practice details the control measures to be applied when using two excavator cranes to lift a load simultaneously.

Scope

This Code of Practice applies to the use of two excavator cranes which normally lift loads independently but which are required to occasionally lift a load in conjunction with another similar excavator crane using a process known as Tandem Lifting. This Code of Practice applies to both road and rail lifting operations on Network Rail managed Infrastructure.

Definitions

Crawler machine	A excavator crane with tracks rather than wheels
Tandem Lifting	The lifting of a single load using two lifting machines working together under the direction of a single Crane Controller (TL), trained and certificated to control tandem lifting operations under the Sentinel scheme

Note: where two excavator cranes are being used:

- physically connected, and
- controlled by a individual operator, and
- the RCI on either one stops the movements controlled by the RCI of both excavator cranes

then this is not tandem lifting and is not subject to the controls described in this COP. In this instance a Crane Controller with the appropriate counterpart and not a Crane Controller Tandem Lift operations will be required.

1 Principles

1.1 The use of more than one excavator crane to lift the same load simultaneously is a potentially hazardous operation and should only be resorted to where the site conditions, physical dimensions, characteristics or weight of the load prevent it being lifted by one excavator crane. Should it be necessary to resort to tandem lifting then this Code of Practice should be followed to assist in controlling the risks.

Note Where travel on rail is required consideration should be given to lowering the load onto trailers rather than using tandem lift and carry

1.2 When using panel grabs, tandem lifting should only be carried out with

a) the excavator cranes physically linked by rigid bar and/or trailer(s)

and / or

b) the two excavator cranes both have a minimum length of 500 mm flexible link (chain or cable) between the crane lifting point and panel grab

1.3 Any lifting accessories necessary to achieve the lift should be included as part of the total load calculated in 1.4 and 1.5

1.4 In order to maintain stability during tandem lifting, the normal safe working load of each excavator crane for the required duty and operating radius should be not less than the calculated share of the total load to be handled by each excavator crane during the operation, plus 50%.

eg 8 tonne load shared equally then 4 tonne per Crane + 50% means that each Crane needs a SWL of 6 tonne at the required radius.

1.5 When an unequal load is lifted both excavator cranes should have the capacity at the working radius used to lift the heavier end using the principle in 1.3.

eg 8 tonne load shared unequally 5 tonne and 3 tonne then BOTH cranes will need a SWL of 5 tonne plus 50% ie 7.5 tonne at the radius being used (see diagram 1).

1.6 On and Off Tracking should not take place whilst Tandem Lifting.

2 Process

2.1 Planning

2.1.1 Tandem lifting operations should always be planned (see COP0011 for guidance). A documented lift plan should be produced in advance by a competent Crane Controller (TL) (Sentinel registered) or Lift Planner (TL) who is conversant with this Code of Practice.

2.1.2 Operators of excavator cranes being used to carry out the Tandem Lifting should be trained, assessed and certified competent in Tandem Lifting in accordance with M&EE COP0001 and be conversant with the contents of this Code of Practice.

Note: National OTP operator competence scheme compliance date is 31st December 2010.

2.1.3 A thorough assessment of the proposed operation should be made and the method adopted should be such that no excavator crane being used is at any time loaded beyond its Safe Working Load following re-rating as in section 1.3 and 1.4.

2.1.4 Lifting accessories planned to be used during Tandem Lifting should be capable of lifting the maximum load plus 50%.In addition the lifting points planned to be used during Tandem Lifting should be rated for lifting the maximum load plus 50%

2.1.5 Both excavator cranes being used to execute a Tandem Lift should have similar characteristics eg:-

- Load/radius capacity
- Boom configuration
- Speed of operation

2.1.6 Any excavator crane used for Tandem Lifting should be fitted with a rated capacity indicator (RCI) with a lift and carry duty.

2.1.7 Some excavator cranes have an RCI fitted with a 'Tandem Lift' mode. Where possible these excavator cranes should be planned to be used for tandem lifting.

Note When this mode is being used the alarm and motion cut out will be activated by the RCI at the planned downrated figure (as calculated in section 1.4 above) and this will have the affect of preventing the machine from becoming overloaded.

2.1.8 When excavator cranes are in road configuration and used for moving along a ballast bed consideration should be given to uneven surface where sleepers have been removed. Where practical a crawler machine should be used which helps mitigate against uneven ground conditions.

2.2 Site Working

2.2.1 There must always be a crane controller (TL) in charge at the actual site of each and every tandem lift

2.2.2 The Crane Controller should be trained, assessed and certified as competent in Tandem Lifting (TL) as laid down in the national machine crane controller scheme and conversant with this Code of Practice.

2.2.3 Where two excavator cranes are required to work together to lift the same load, one Crane Controller should be in overall control of the two excavator cranes and should be in receipt of the previously prepared lift plan. The Crane Controller should have agreed the lift plan with the operators of the excavator cranes before any Tandem Lifting takes place.

2.2.4 Before any Tandem Lifting commences the Crane Controller should ensure that the operators have a clear understanding of the work to be undertaken and the communications to be used, the procedures being rehearsed where necessary.

2.2.5 Where the Crane Controllers signals cannot be clearly seen by both operators, radio communication should be used between the Crane Controller and the operators. Only an agreed dedicated radio frequency band should be used by the Crane Controller to give instructions to the operators. Each operator and crane controller should be given a unique call sign.

Note: To ensure the operator can maintain full control of the excavator crane at all times hands free radio equipment should be used.

2.2.6 The load should always be maintained vertically below the load lifting point of the excavator crane throughout the operation.

2.2.7 Where an excavator crane has an RCI fitted with a 'Tandem Lift' mode the RCI should always be switched into 'Tandem Lift' mode when undertaking tandem lifting operations.

2.2.8 In some circumstances there can be a motion cut (see Note 1 beneath 2.1.7) of the excavator crane. Once the motion cut out has activated it may not be possible to lower the load safely to the ground. As soon as a motion cut out of one excavator crane occurs

a) the crane controller should cease all movements of both excavator cranes

b) with reference to the duty charts it should be ascertained why the motion cut has occurred

c) the crane controller should agree with both operators a process to enable a movement back to a more stable position and where necessary revise the lifting plan

d) the revised lifting plan should be briefed to both operators, who then carry out the rectifying movement.

e) the crane controller should decide if the required lift can be accomplished by an alternative lift plan. If it can be accomplished the lift plan should be amended

LIFTING AN EQUAL LOAD

LOAD SHARED EQUALLY
4 TONNE PER CRANE

SWL REQUIRED BY EACH CRANE IS:
4 TONNE + 50% = 6 TONNE

BOTH CRANES REQUIRE A MINIMUM SWL OF 6 TONNES AT THEIR WORKING RADIUS

LIFTING AN UNEQUAL LOAD

LOAD SHARED UNEQUALLY
5 TONNE & 3 TONNE

SWL REQUIRED BY EACH CRANE IS:
5 TONNE + 50% = 7.5 TONNE

BOTH CRANES REQUIRE A MINIMUM SWL OF 7.5 TONNES AT THEIR WORKING RADIUS
Note: CRANE B REQUIRES SWL OF 7.5 TONNE AT RADIUS B

Note: IN BOTH EQUAL AND UNEQUAL EXAMPLES 'A' AND 'B' RADII MAY NOT BE THE SAME.

Diagram 1

References

Document	Title
BS 7121 (series)	Safe Use of Cranes
GE/RT8000	Rule Book
LOLER	Lifting Operations and Lifting Equipment Regulations
M&EE COP0001	Operator competency standards for possession only rail vehicles
M&EE COP0002	Minimum Requirements for the planning and management of possession only rail vehicles
M&EE COP0011	Planning and Executing Lifting Operations
M&EE COP 0016	RRV & RMMM Machine/Crane Controller Checklists.
RIS-1530-PLT	Rail Industry Standard for Engineering Acceptance of On Track Plant and Associated Equipment
RIS-1700-PLT	Rail Industry Standard for Safe Use of Plant for Infrastructure Work