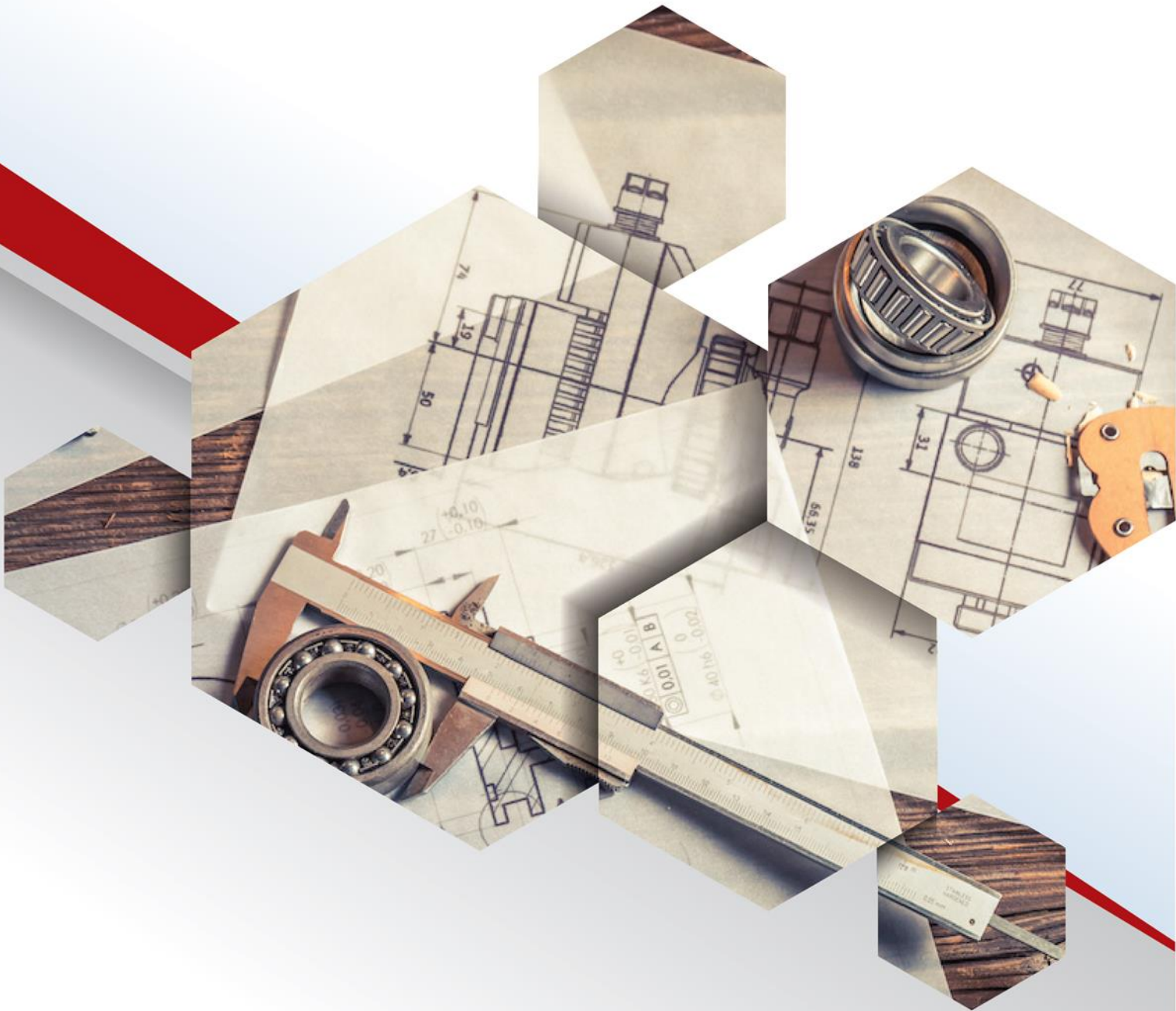


Code of Practice: Plant Any Line Open (ALO) Working



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Sign off

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Background

The M&EE Networking Group is an established body of professional railway engineers and operators experienced in the operation and use of on-track machines (OTM), on-track plant (OTP) and portable and transportable equipment. The focus of the group is to share information and to provide good practice to the rail industry relating to:

- operational and technical safety.
- added value (in terms of reliability and availability).
- environmental, sustainability and working with other industry bodies.

M&EE COPs are produced for the benefit of any industry partner who wishes to follow the good practice on any railway infrastructure. Where an infrastructure manager has mandated their own comparable requirements, the more onerous requirements should be followed as a minimum for work on their managed infrastructure.

The M&EE Networking Group makes no warranties, express or implied, that compliance with this document is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

We use the terms “must” and “should” throughout the Code of Practice. We use the term “must” when the person in question is legally required to do something and “should” when the advice set out should be followed unless there is good reason not to.

Issue record

Issue	Date	Comments
1	June 2015	First issue
2	Nov 2017	General review, foul point calculation added, the scope now covers plant maintenance/repair activities
3	Jan 2020	General review, removal of references to the virtual panel and control system calculator. Introduced new term Exclusion distance. 3m planned limit of work changed to 4m on a curve, clarified testing of ALO system prior to on tracking. Clarification added on working without limiters. Clarification when working on Station platforms.
4	Oct 2022	Minor changes to Section 2.1 new drawing added for rail. Minor errors amended
5	Jan 2024	References made to CPA good practice guide and enhanced section 2.1.1. Changed definition of planned limit of work to limit of work dimension, new definition for planned working limit. 3.5.2 and 3.5.3 deleted and replaced by new section 3.7 for rail mounted plant only. New 3.3.10 consideration of Live OLE

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Purpose

This Code of Practice provides guidance on how to safely manage Plant working ALO.

Scope

This Code of Practice is for any activities undertaken on the rail infrastructure where plant could foreseeably foul lines open to traffic.

It covers all activities carried out by on track plant (OTP), civil construction plant and on track machines (OTM), repair and maintenance, delivery and collections including those made by road vehicles.

It does not cover working above lines open to traffic, specific approval for this type of work should be obtained from the infrastructure manager.

Working with any lines open to traffic should only be undertaken as a last resort in accordance with the principles of prevention included in the Management of Health and Safety at Work Regulations 1999.

Where work is planned to be undertaken outside the railway boundary the contractor should contact the asset protection department of the relevant infrastructure manager where processes will be implemented to manage a safe system of work. There are requirements for Cranes working alongside the Railways controlled by Network Rail issued by the Construction Plant-hire Association (CPA) Good Practice Guide.

Reference documentation

Reference number	Title	Context
RIS-1530-PLT	On-Track Plant, Trolleys and Associated Equipment.	Definitions MLD, OTP
	CPA Requirements for Mobile Cranes alongside the railways Controlled by Network Rail	Scope - Civils plant working in proximity to railway lines
GMRT2400	Engineering Design of On Track Machines in Running Mode	Definitions OTM

Table 1 Reference Documents

Definitions

Term	Definition
Any Line Open (ALO)	Any railway lines open to traffic could, without controls, be foreseeably fouled by any plant, attachment or the loads associated with them.
ALO Champion	A nominated person within an organisation who will lead on ALO matters.
ALO Co-ordinator	An individual appointed within an organisation / project (during the planning process) who has detailed knowledge and experience to undertake site coordination duties for all ALO Working within the work plan
ALO Planner	An individual with suitable knowledge and experience to produce the ALO work plans.
ALO Responsible Manager	An individual appointed within an organisation / project with sufficient knowledge and experience of the work methodology and ALO Working in order to review, challenge and amend where necessary all ALO Working within the given area / project. The Responsible Manager must also have suitable knowledge of the ALO change control process and be able to authorise on site changes if necessary.
ALO Working	Where any railway lines open to traffic could foreseeably be fouled by any plant, attachment or the loads associated with them. This includes delivery and retrieval activities.
Controller of the Plant	The person responsible for directing the machine, e.g. Machine Controller; Crane Controller; Banksman etc.
EAC/ECC	Engineering Acceptance Certificate, provided to document compliance with a specified standard, replaced by an ECC January 2016 (engineering conformance certificate) which will serve the same purpose.
Exclusion Distance	The distance any part of the machine, attachment or load must remain away from the nearest open running line
Foreseeably Foul	The test of foreseeably fouling an open line is that the plant (and associated load) at its maximum reach cannot reach the fouling point of the open line even in the event of human error but not taking into account deliberate acts.
Foul	Any incursions by plant, attachment or its load, into the combined maximal kinematic envelope of all vehicles that may operate on a line open to traffic (infringing the fouling point).

Term	Definition
Foul Point	The closest vertical edge of the combined maximum kinematic envelope of all conventional UK gauged vehicles that may operate on the lines open to traffic either calculated using ClearRoute™ or estimated using the guidelines set out in this document.
Infrastructure Manager	Any person or organisation responsible for developing and maintaining infrastructure or for managing and operating a station and manages or uses that infrastructure or station or allows it to be used for the operation of a vehicle.
Limit of work dimension	The distance from an open line to the closest part of the machine/attachment/load during the planned operation.
Movement limiting device (“MLD”)	Movement limiting devices protect against any inadvertent exceedance of lateral and vertical limits of work, there are 2 levels of MLD: 1. Low performance devices that do not meet the requirements of 2 2. High performance movement limiting devices shall be designed so that there is no credible single point failure that would cause the system to fail to an unsafe condition as described in RIS-1530-PLT and meets the requirements of the infrastructure manager.
Note: Relevant Infrastructure Manager approved MLD’s meet the requirements of a High Performance MLD.	
NTS	Non-Technical Skills
Organisation	Any organisation undertaking work under contract to, or managed by, the infrastructure manager.
OTM	On track machine, machines that are permitted outside of a possession, as described in GMRT2400.
OTP	On track plant, machines that are not permitted outside of a possession, as described in RIS-1530-PLT.
Planned working limit	Distance from the centre of machine to the furthest point of the machine/attachment/load towards the open line
Plant	Means on-track machines, on-track plant, portable and transportable plant, cranes or other mobile plant including road vehicles operated on or near the railway and used for infrastructure related activities.
RRAP	Road Rail Access Point.
Separation Distance	Distance between the limit of work dimension and the fouling point of the open line

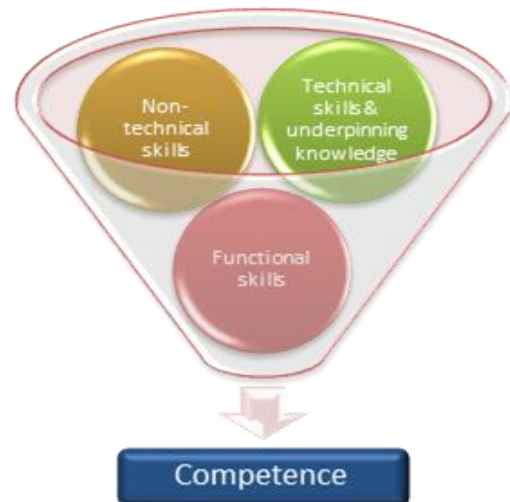
Table 2 Definitions

1 Roles & responsibilities

1.1 Selection of ALO roles

1.1.1 There are 3 areas to consider when selecting individuals to undertake the below ALO roles as recommended by the RSSB NTS model:

- Non-technical skills - this describes skills that underpin the technical skills required to carry out a role.
- Technical skills – this describes skills required to carry out the role including underpinning knowledge.
- Functional skills - describe the other skills required such as literacy, numeracy and IT skills.



1.1.2 Non-technical skills (NTS) are generic skills that underpin and enhance technical tasks. A technical task requires a practical understanding of the relevant techniques, procedures, roles and responsibilities, all of which are formally assessed to ensure the person can carry out the safety-critical task. But apart from that specialist, technical knowledge, safety-critical staff will also draw on a range of NTS to carry out a task. These include the ability to take in information, focus, take decisions, and communicate with others. NTS play a vital role in safety by helping people to anticipate, identify and mitigate errors. An explanation is shown in Table 3.

1.1.3 The competency requirements and responsibilities of specified roles related to ALO are shown in Table 4.

	NTS Category	NTS skill
1	Situational awareness	Attention to detail Overall awareness Maintain concentration Retain information Anticipation of risk
2	Diligence	Systematic and thorough approach Checking Follows rules and procedures
3	Communication	Listening (people not stimuli) Clarity Assertiveness Sharing information
4	Decision making and action	Effective decisions Timely decisions Diagnosing and solving problems
5	Cooperation and working with others	Considering others' needs Supporting others Treating others with respect Dealing with conflict / aggressive behaviour
6	Workload Management	Selective attention Prioritising Calm under pressure
7	Self-Management	Motivation Confidence and initiative Maintain and develop skills and knowledge Prepared and organised

Table 3 Non Technical skills

Role	Employee Competency	ALO Responsibility
ALO Planner duties	<i>Typically but not limited to:</i> Project Planner, Section Planner, Lift Planner, Section Supervisor / Manager, Construction Manager, Engineer	The individual should have suitable knowledge and experience to complete the ALO work plans and must always plan working to the principles of prevention. The ALO Planner should insert as much detail as possible when completing the ALO work plan, seeking guidance from the ALO Champion if necessary. All ALO working plans should be developed giving consideration to this COP. Upon completion, the ALO work plan should be submitted to the ALO Responsible Manager for review and authorisation, Once the plan has been authorised and a unique authorisation number issued the ALO work planner will then submit the plan to the ALO Coordinator who will be undertaking the work. Should the plan be returned with no authorisation number the ALO Work Planner will review any comments / instruction received from the Responsible Manager and make any amendments necessary. The plan will then be resubmitted to the Responsible Manager for review and authorisation. Should any amendments / changes to the ALO work plan be required the ALO Work Planner should create an updated version of the work plan ensuring it is version controlled and reviewed following the change. (All versions of the plan should be kept for auditing purposes).

Role	Employee Competency	ALO Responsibility
ALO Coordinator duties	<i>Typically but not limited to:</i> Site Supervisor, Site Manager, Person in Charge of Work, Team Leader, Senior team member, POS holders rep.	The ALO Coordinator should be in possession of an authorised copy of the ALO work plan and be able to review and challenge ALO Working relevant to that individual plan. The ALO Coordinator should ensure that the control measures identified on the work plan have been tested, implemented and are monitored for all plant and load (including construction plant) that is working alongside lines that are open to traffic. The individual is responsible for the detailed briefing of all relevant site staff as to the arrangements of ALO Working and should ensure the minimum permissible Planned Separation distance and the ALO Plan are implemented and tested prior to the work commencing while off track in a safe area before on tracking the machine. The system should be checked again once on track to ensure orientation and the system parameters are still correct. The ALO Coordinator should have a detailed knowledge of the ALO change control process and be able to implement on site change control if necessary, using the on-site Change Control Checklist The ALO Coordinator should complete the ALO Site Coordinators checklist for all ALO Working. The ALO Coordinator should be issued with the following; • ALO Coordinator Armlet for easy identification Measuring tool (tape measure, laser)
ALO Responsible Manager duties	<i>Typically but not limited to:</i> IMDM, IME, Project Manager, HSE Manager, Contractors Nominated Manager, CRE	The ALO Responsible Manager will review the control measures for adequacy and either: Approve / Reject the controls proposed, or require the implementation of additional controls, or refer to the ALO Champion, or reject the proposed controls The ALO Responsible Manager will approve all change requests. The ALO Responsible Manager should be able to demonstrate control of the approval process.

Table 4 Competency and responsibility of specific roles

2 Guidance for ALO planning

2.1 Plant that cannot foreseeably foul

2.1.1 A documented risk assessment should be completed which shows that the plant at its maximum reach / gauge (including load and attachments) cannot foreseeably foul the open line. Consideration should be given to construction sites that have slopes that fall towards the track. The risk assessment should show how an uncontrolled/inadvertent movement of plant is managed and mitigated.

Note 1 Generally if a line is open and plant is working inside the boundary fence then work will be classed as ALO, unless it can be proved otherwise.

Note 2 When determining if plant can foreseeably foul the assessment needs to take account of relevant factors such as, ability for the plant to move towards the open line, load swing, slew speed, ground conditions and slope.



Figure 1a Diagrammatic view of plant working that cannot foul (rail)

2.2 Plant that can foreseeably foul

- 2.2.1 Where plant can foreseeably foul, then 2.3 onwards should be followed for each discrete activity and each discrete location, e.g. the on tracking site may be different to the site of work. The guidance applies to the plant, attachment and any load carried / lifted which may infringe any open line. You should consider all aspects of the activity; a list of typical activity considerations for planning can be found in Appendix B.
- 2.2.2 In line with the risk profile of the works, assurance checks proportionate to the risk should be carried out by the organisation. Template assurance checklists can be found in Appendix C and used as a management assurance tool.

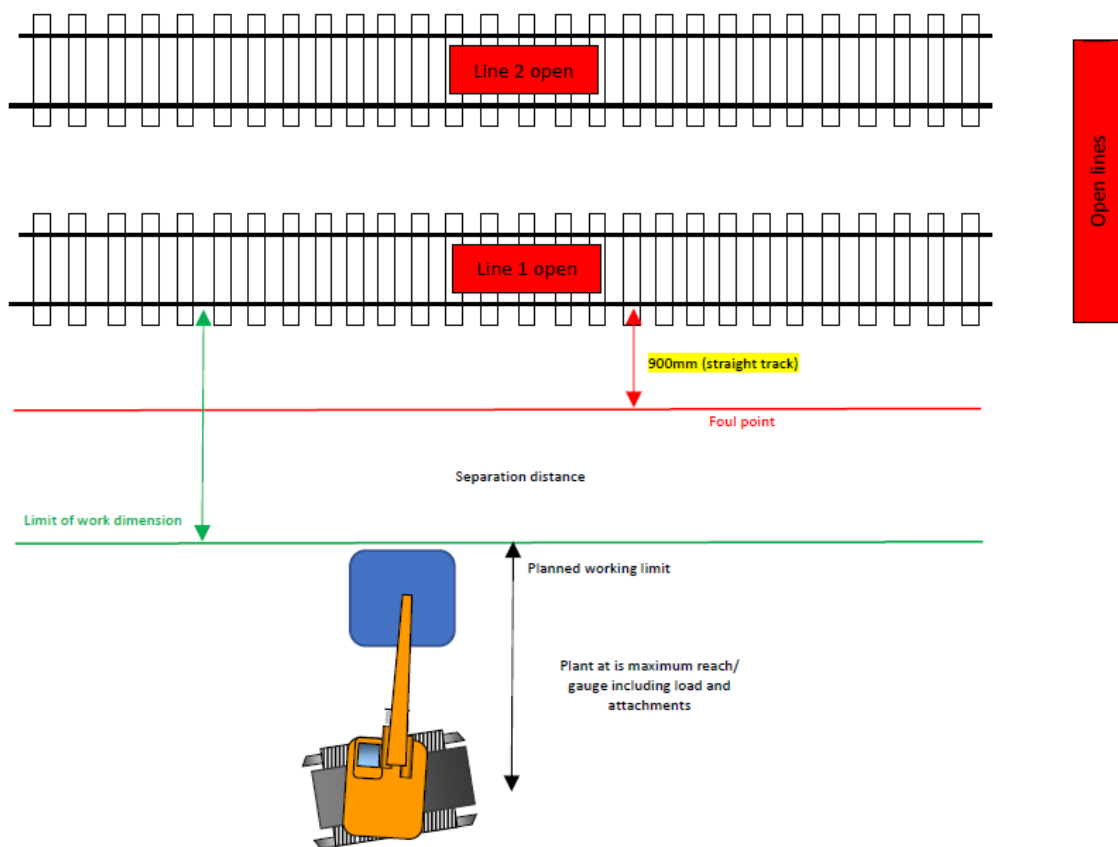


Figure 1b Diagrammatic view of plant working that could foreseeably foul

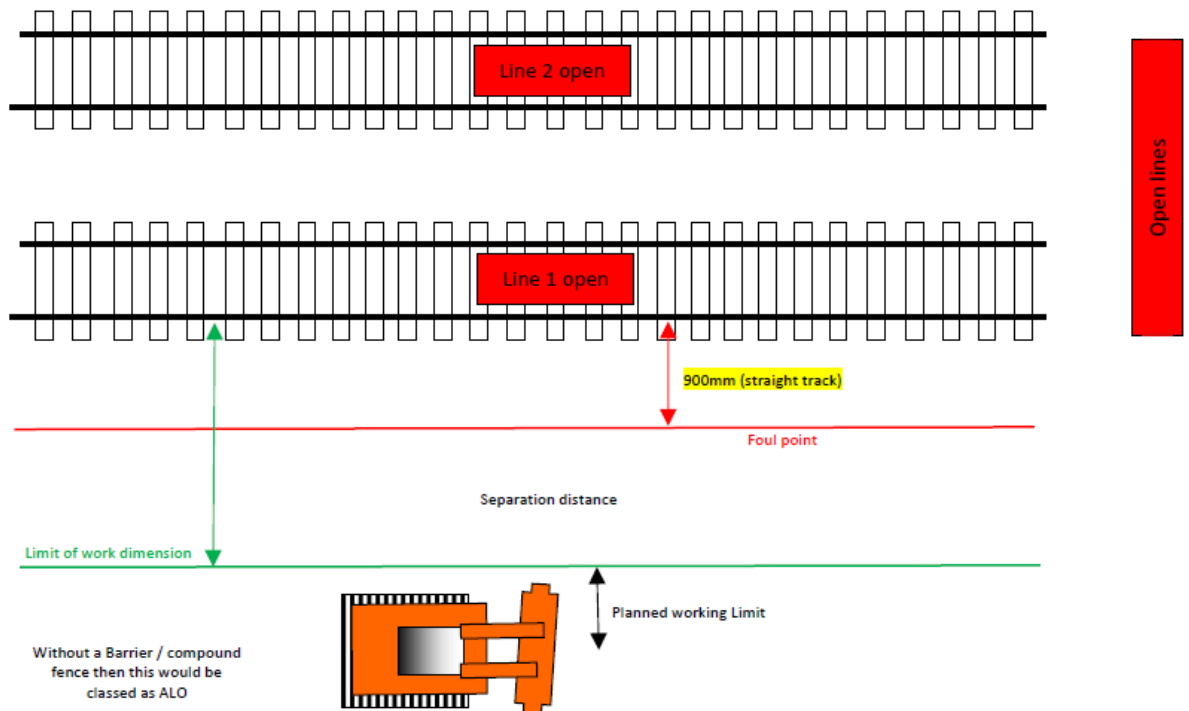


Figure 1c Diagrammatic view of plant working that could foreseeably foul

2.3 Long Term Planning

- 2.3.1 The infrastructure manager should consider the impact of ALO Working as part of the planning / pre-tender stage to ensure an ability to negotiate track access for the works, taking into account the 'General Principles of Prevention' as defined in the Management of Health and Safety at Work Regulations 1999.
- 2.3.2 Detailed planning may proceed taking into account the agreed access, intended outlined working methodology and chosen plant. Throughout the detailed planning process, all planners should periodically check if additional possessions / blockages required to remove ALO Working have become available, if so these should be used.

2.4 Detailed planning process

- 2.4.1 The detailed planning process is shown in flowchart format in Figure 2, with each stage explained in Table 5.

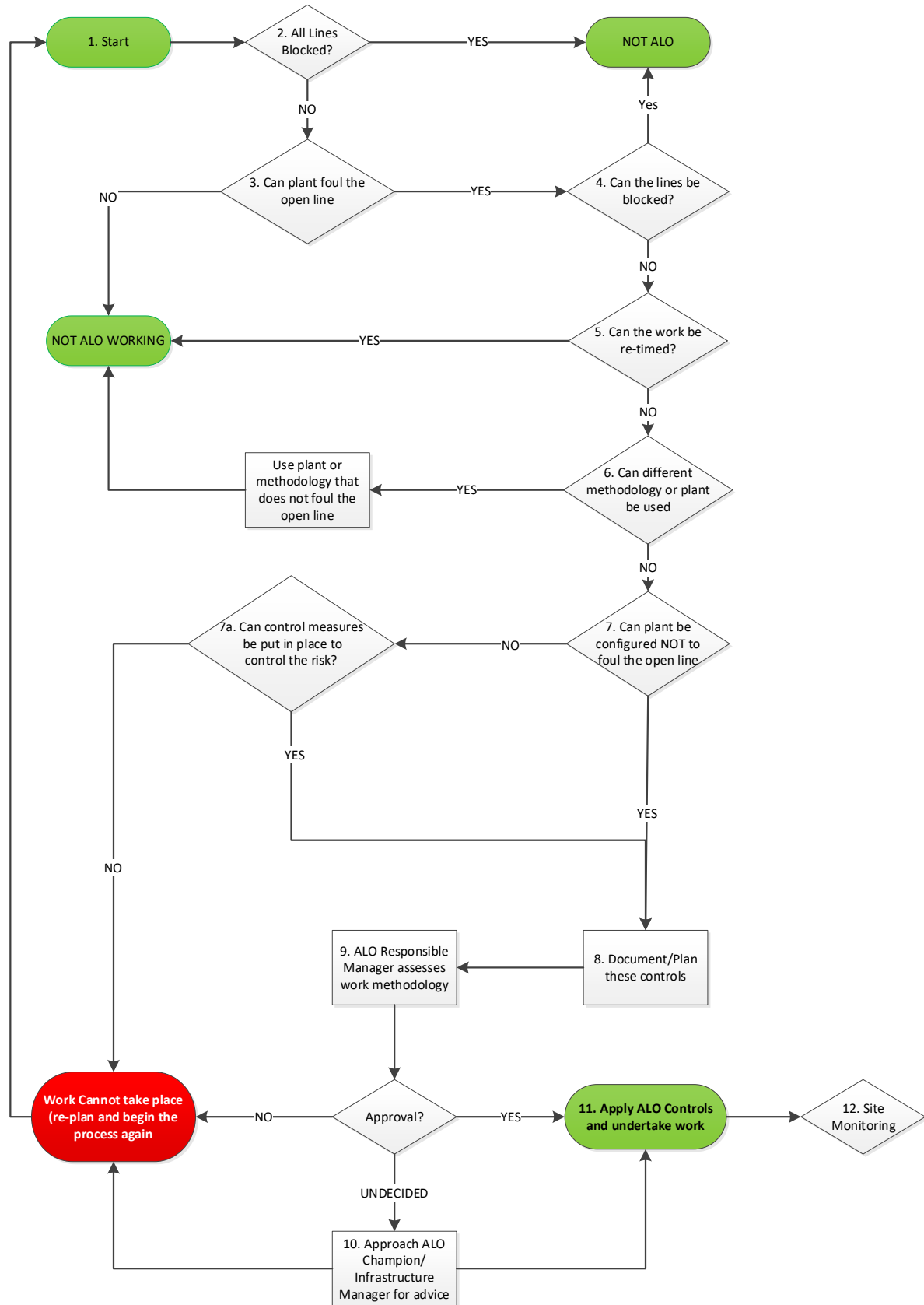


Figure 2 Detailed planning process flowchart

Note An assessment should be made at each stage to determine whether the methodology delivers a working risk reduced so far as is reasonably practicable.

Process step		Comments
1	Start – plan work methodology	The provisional outline methodology should be confirmed and developed into a detailed methodology to control the work activities. ALO requirements should be assessed around any already agreed access. Design development may also highlight needs for ALO Working that were not previously foreseen.
2	All lines blocked?	YES – If all lines at the location are blocked for the full duration of the works then no additional ALO controls are required.
		NO – If any line(s) remains open that can be affected, the processes detailed in this guidance should be followed.
3	Can plant, attachment / load foul an open line?	The proposed working methodology and selected plant should be assessed to determine whether there are risks of fouling an open line. Other risks should also be considered that would affect the ALO planning eg distance from live OLE etc. Risks identified should be recorded for audit and approval purposes.
4	Can affected lines be blocked?	Where lines can be fouled during the work, the option of blocking open lines for the duration of the activities should be the first choice. This could include reviewing whether additional line blockages are now available which were not considered or available in the long term planning.
5	Can the work be retimed to prevent ALO Working?	Consider retiming the work to a period when the affected lines can be blocked for the duration of the work activities. Consider breaking the job down into sections of ALO activity that can each be timed to be protected by a Line Blockage. YES – the work is retimed then adequate access should be arranged and detailed planning finalised, then no additional ALO controls are required. NO – Where retiming the work does not reduce the risk so far as is reasonably practicable then a different methodology or alternative plant should be considered (go to stage 6 below).

Process step		Comments
6	Can different methodology or plant be selected to prevent ALO Working?	The original methodology and / or types of plant selected should be reviewed to determine if an alternative way of working can be found. Where suitable alternative plant or a different methodology can be found that reduces the risks so far as is reasonably practicable then the detailed work planning may proceed.
7	Can plant, attachment / load be configured not to foul lines open to traffic?	YES – The foul point should be calculated as section 3.4 and the appropriate control measures in 7a implemented NO – Use multiple layers of control, move to 7a.
7a	Control measures	Engineering Controls, for example - movement limiting devices - Physical barrier These should be used with additional process controls. e.g. banksman, fencing, Duplex Comms, assurance checks etc. Where the plant, attachment / load is closer than 4000mm (curved track) to the nearest open line one or more of the following should be used. • High performance MLD • line blockage should be used/in place. • The physical barrier must have the ability to prevent the plant from fouling the open line Where a MLD is not fitted to the plant (or not being used), the plant should be maintained at least the maximum reach including attachment or load does not encroach the high performance area. other methods should also be implemented (e.g. wall, barrier, train, tunnel, demarcation etc.) If 7 or 7a cannot be achieved then the work cannot take place.
8	Document ALO Plan	ALO Plan should be documented for approval by ALO Responsible Manager.

Process step		Comments
9	ALO Responsible Manager approval	All ALO Working methodology should be assessed by an ALO Responsible Manager. This includes works that will be delivered in whole or part with lines open to traffic. The Responsible Manager should review the control measures for adequacy and either: - Approve the controls proposed - Approve with the implementation of additional specified controls - Reject the proposed controls and require resubmission of plan Where the responsible manager does not require further guidance in order to make a decision, continue to step 11.
10	Referral to ALO Champion	Where the Responsible Manager needs further guidance, the work should not proceed and they should refer the proposed work to the ALO Champion. Where the ALO Champion needs additional guidance they may contact the relevant Infrastructure Manager.
11	Apply ALO controls	The approved control measures should be implemented and tested by the ALO Coordinator before the work is authorised to start, while off track in a safe area before on tracking the machine. The method statement / WPP and site supervision should include checks by the controller of the plant that the control measures are correctly implemented, tested and will remain in place for the full duration of the activity that could foul the open line. When using MLD's to prevent any part of the plant from fouling an open line, these should be tested prior to undertaking the activity. MLD's where fitted with a locking system, shall be secured such that the operator is not able to over-ride them; unless a documented risk assessment determines this is not required. They are properly set up and that they are switched on and remain so during the work. Works should not start until the required controls are in place and tested, provided that the control measures remain effective throughout the duration of the works.
12	Works proceed	The ALO Responsible Manager should arrange for appropriate assurance arrangements to be in place. If there is a change on site, works should stop until the change control process has been carried out.

Table 5 Steps in detailed planning process

2.5 Planning for contingencies

2.5.1 When considering ALO Working, foreseeable events should be anticipated and contingencies planned for when they are likely to be required. Examples of foreseeable events include:

- Different plant being provided than requested;
- Where ALO controls cannot be implemented due to a delay in taking a possession / line blockages e.g. late running train services and / or engineering trains delay work.

The contingency arrangements should not degrade the implemented level of risk control

2.5.2 Any changes which affect the planned work (lift plans; method of working; late granting of possessions) then the control systems and measures planned should be reviewed and confirmed by the ALO Coordinator that they are still valid and appropriate.

Note Changes to the ALO Plan should be managed as detailed in section 3.2

2.6 Undertaking plant maintenance and repair activities

2.6.1 When undertaking plant maintenance and repair activities, a documented ALO risk assessment should be undertaken prior to the start of the activity to ensure a safe system of work is in place following the principles as set out in this COP.

2.6.2 Planned maintenance activities should be carried out in a pre-planned controlled area to mitigate the risk of ALO

2.6.3 Where repairs are required to be carried out with a line open to traffic then the ALO process should be followed.

3 Implementing, testing and monitoring ALO controls

3.1 Implementing, testing of ALO controls

3.1.1 The methodology and control systems should be implemented by the ALO Coordinator in accordance with the plan. Whilst on site, checks should be made to ensure that any controls implemented to prevent the plant, attachment or load fouling any open line remain robust.

Prior to commencement of ALO working the ALO Coordinator should validate the track intervals shown in the ALO plan by tape measure or laser measure tool.

For civils machines the correct distance of barriers/markers should be checked prior to working

3.1.2 The ALO Coordinator appointed to check / monitor the correct implementation of the control system should keep records of the checks carried out.

3.2 Change control of ALO controls

3.2.1 Change control is fundamental to the stability of any work. Following any change in circumstance the necessary risk assessments should be completed in order to undertake work with plant next to lines that are open to traffic.

3.2.2 If a change is required, then the flow diagram in Figure 3 should be followed.

3.2.3 There should be an ALO responsible manager available at all times (normal office hours & out of hours) to review and authorise any changes that are required.

3.2.4 Contact details should be documented in the ALO Plan/WPP.

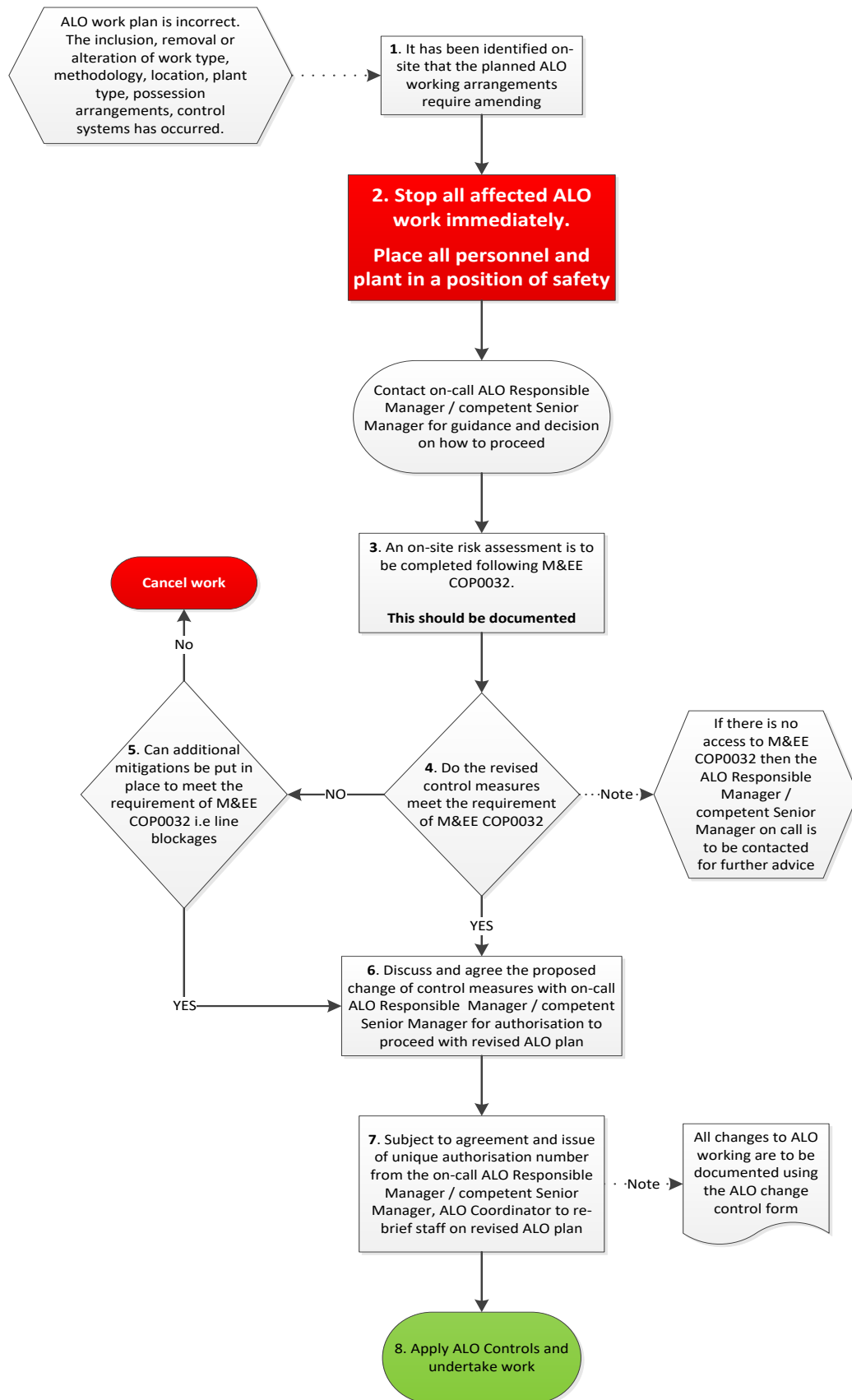


Figure 3 On site change control flowchart

3.3 Risk controls

- 3.3.1 The foul point should be determined as described in section 3.8.
- 3.3.2 When identifying the risk controls to be put in place for the works, the duration and complexity of works and numbers of plant should be considered to determine the correct level of supervision.
- 3.3.3 Plant and operatives should be under the control of a person appointed to supervise and direct the plant operations.
- 3.3.4 Risk controls should be based on multiple layers of controls that would take several deliberate actions to overcome see section 3.4.
- 3.3.5 For all operations, the plant and / or its load must always be 300mm or more from the fouling point of any open line (see Appendix A).
- 3.3.6 The Limit of Work Dimension should take into account all parts of the plant including any load, attachments, or counterweight that could foul the open line. The closest part of the plant, load or attachment to the foul point should be used for the calculation.
- 3.3.7 It is preferable to work to the highest level of control available with the plant being used.
- 3.3.8 When lines are open on both sides of the plant (island working), each affected open line will require controls to be applied.
- 3.3.9 Where ALOs are significantly physically higher or lower than the area where the work is taking place, height limiters may be considered in association with, or instead of, slew limiters.
- 3.3.10 The limit of work Dimension should be calculated based on all risks highlighted in the assessment. This should also include issues like distance to live OLE when working with MEWPs etc.

Note A diagram is included in Appendix A which shows the control level distances.

3.4 ALO multiple layers of controls

3.4.1 The following control measures should be implemented for all ALO activities.

- An ALO Coordinator/s should be appointed and be on site at all times to monitor ALO working.
- Operations should be supervised at all times.
- The position and orientation of the plant relative to the open line should be maintained.
- Line Blockage with additional protection if work could affect the safety of the line (where applicable).
- A load stabilisation method to maintain orientation should be in place (load stabilisation is only applicable when lifting).
- The ALO safe system of work should be checked/tested prior to the work commencing and when the plan changes.
- Where ALO control measures are required to change, there should be visible demarcation to identify this location.
- Approved duplex communication system should be in use.
- Safety devices should be secured such that the operator cannot over-ride them.
- where approved by the Infrastructure Manager, remote control stop/kill switch and system indication lights

3.5 Controls when operating over 4000mm from the nearest open line rail running edge

3.5.1 The controls listed in section 3.4 should be implemented and at least one of the additional controls below followed:

- The use of plant that has a High Performance MLD fitted should always be preferred. Where High Performance MLDs are not fitted, it is acceptable to use a Low Performance MLD as long as they have worked correctly during the test and there is no cause to question their reliability. If MLDs are fitted they should be set up to the planned working limit and be active. Other methods should also be implemented (e.g. wall, barrier, train, tunnel, demarcation etc.)

Note: Mechanical 180° MLD must be configured to protect the line open to traffic.

- Where a MLD is not fitted to the plant (or not being used), the plant should be maintained at least the maximum reach including attachment or load does not encroach the high performance area. other methods should also be implemented (e.g. wall, barrier, train, tunnel, demarcation etc.)

Note Consideration should be given when using long reach machines in road mode as to the orientation and position of the chassis as small changes in angle can produce large movements at the end of the boom. The orientation should be guaranteed relative to the line open to traffic by physical constraint (e.g. any machine with the road wheels or tracks not able to deviate from the planned position or route).

3.6 Controls when operating less than 4000mm from nearest open line rail running edge

3.6.1 The controls listed in section 3.5 should be implemented during all ALO works and at least one of the additional controls below followed:

- The plant must be fitted with a High Performance MLD which must be configured and functioning correctly Where relevant a load stabilisation method is in place that is able to reliably prevent the load from swinging towards the open line.
- There is another method for ensuring that the item of plant and any load cannot physically foul the open line (e.g. train, tunnels, wall, or barrier which is capable of withstanding foreseeable forces exerted during operation) and that the method used can be demonstrated to reliably prevent the plant and load from fouling.

Note Any use of an MLD cannot be considered as a high performance unless the orientation and position of the chassis can be guaranteed relative to the line open to traffic by physical constraint (e.g. rail machine on the rail, or any machine with the road wheels or tracks not able to deviate from the planned position or route).

3.7 Rail Mounted Plant Only

3.7.1 Where the track is nominally straight (radius greater than 10,000m) the high performance working area can be reduced to 3000mm as shown in Appendix-A

3.7.2 Where required an intermediate value between 3000mm and 4000mm can be determined for specific curve radius and cant see section 3.9.

3.8 Foul Point

3.8.1 The foul point may be determined by either:

- Simplified method shown in section 3.9.
- Or
- gauging software to calculate the foul point specified by the infrastructure manager e.g. ClearRoute™ e.g. High Output Track renewal/cleaning operations.

3.9 Determining the Foul Point

3.9.1 Where absolute working clearances are not required the foul point should be determined as follows;

- distance from nearest running edge of the open line + cant allowance

3.9.2 The minimum exclusion distance from the nearest running edge of the open line to traffic should be taken from Table 6.

Curve radius (of adjacent line)	Foul Point	Minimum Exclusion distance
	Before cant allowance	
Straight track 10,000m or more	900mm	1200mm
Curve radius more than 400 metres	1000mm	1300mm
Curve radius more than 201 - 400 metres	1100mm	1400mm
Curve radius more than 75 - 200 metres	1400mm	1700mm

Table 6 Radius v ALO Foul point & Minimum Exclusion distance

3.9.3 The cant allowance can be calculated as follows:

$$\frac{\text{working height (mm)} \times \text{cant (mm)}}{1435}$$

The cant allowance only applies where the open line is canted towards the site of work. Cant allowance values are shown in Table 7.

Cant allowance for various track cants

These values are based on max working height of 3500mm and rounded up for convenience. (calculated dimensions can also be used)

Cant	Cant allowance
Zero	Zero
50mm	125mm
100mm	250mm
150mm	375mm
200mm	500mm

Table 7 Cant allowance values

Calculating the Foul Point example

A road-rail vehicle is planned to work up to a height of 3500mm adjacent to an open line with 550m curve radius and 150mm cant towards the road-rail vehicle.

Fouling point before cant allowance	=	1000mm (from Table 6, since curve radius is more than 400m)
Allowance for cant	=	$\frac{3500 \times 150}{1435}$ ~375mm (Table 7)
Foul point	=	1000mm + 375mm

Foul point is therefore 1400mm from the nearest running edge of the adjacent open line and rounded up for convenience

Table 8 Calculating the Foul Point example

4 Documenting the System

4.1 Each site should have a document that details the ALO work carried out on the site and the controls for each activity as shown in Table 9.

Document	Description
ALO Work Plan	This document should detail ALL ALO Working and must be approved by the Responsible Manager with a unique authorisation number prior to issue to site. As a minimum this should include: Date works being undertaken (from – to) Location of works Plant ID Control measures being used Distance of plant from Foul Point Type of MLD and setting to be used (where necessary)
ALO Responsible Managers Authorisation control (Optional)	This document can be created to allow the responsible manager to keep track of all ALO working authorisation numbers that have been issued, should they wish to do so
ALO Site Coordinator's Checklist	This document should be completed for all ALO working to demonstrate that the ALO controls are in place, have been tested, all personnel briefed, and that ALO Working can proceed safely.
Note:	A new ALO Coordinator's briefing should be given each time there is a shift changeover between ALO Coordinators and whenever there is a workforce shift change. E.g. Machine Operator or Machine / Crane Controller and this brief should be documented on the ALO Coordinators' Checklist.
ALO Change Control	There should be a documented process for the Responsible Manager to review the safe system of work and ensure that all ALO controls are put into place prior to allowing any change of the planned controls being implemented.
Management Assurance Check sheet	A document that allows the company to monitor the compliance to the ALO process

Table 9 Documents required for ALO

5 Obtaining ALO Additional Guidance

5.1 Process for review

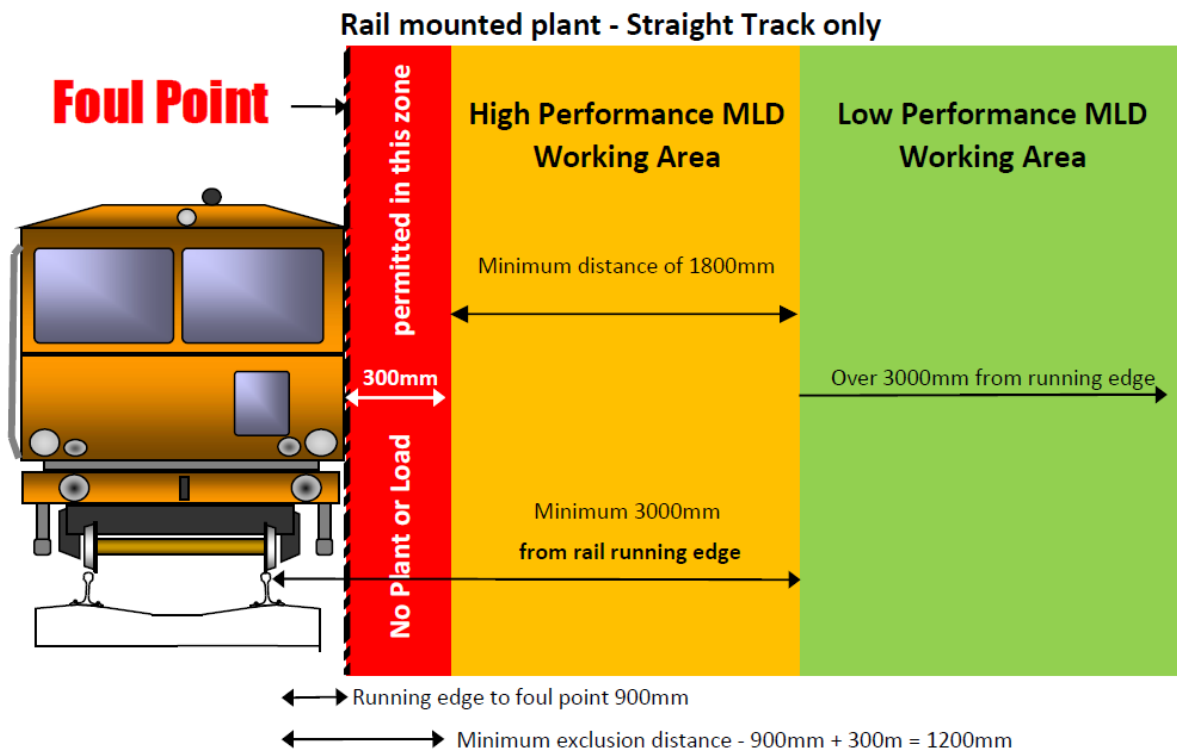
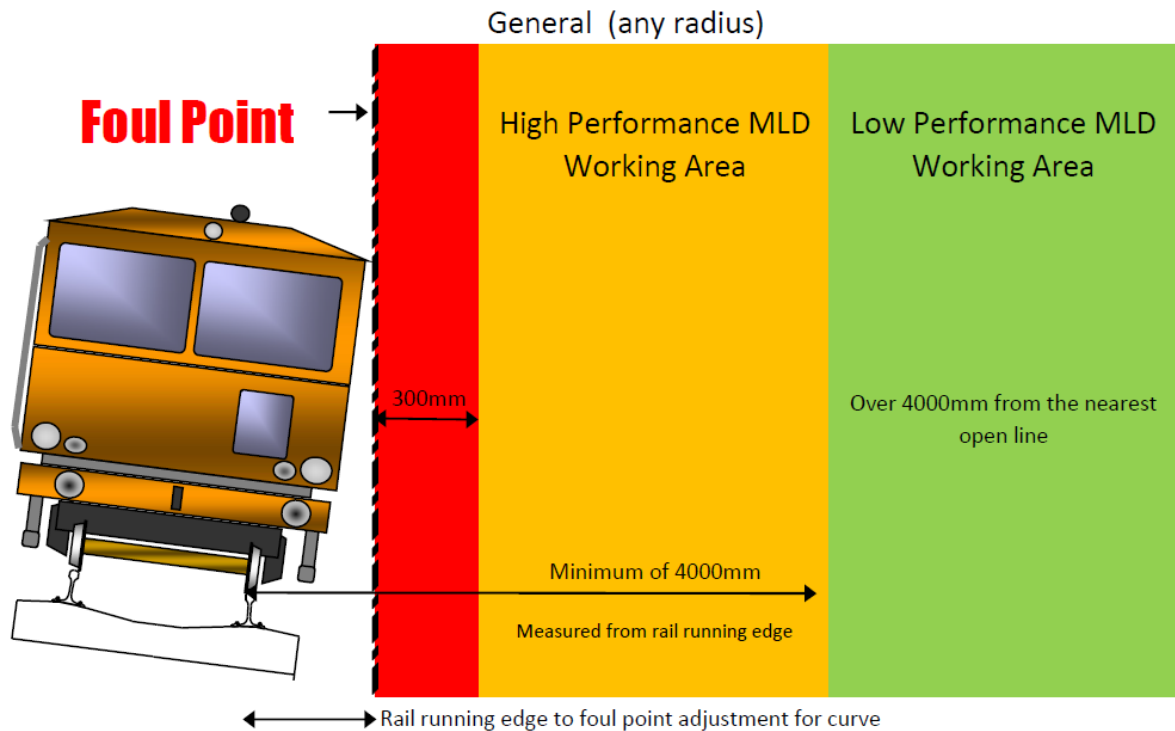
5.1.1 Internal Review

5.1.1.1 Each organisation should have an ALO Champion who will review the ALO controls developed within the company (when requested by the ALO Responsible Manager) and give advice on whether the controls are adequate.

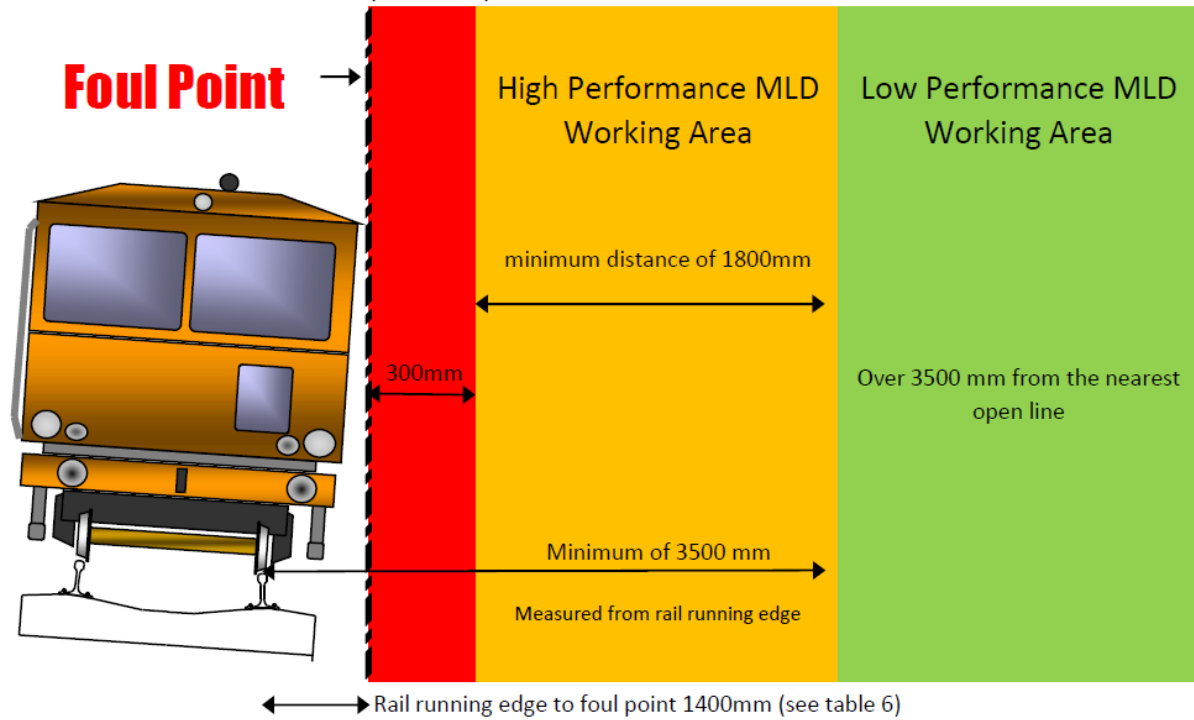
5.1.2 External Review

5.1.2.1 The ALO Champion can contact the Infrastructure Manager for additional guidance if needed.

Appendix A - ALO working Areas



Rail Mounted plant - Specific radius 550 metres with 150mm cant



Appendix B - Activity Considerations

Points for consideration while planning:	
1	Will the plant be close enough to an open line to be considered ALO? This should consider plant delivery/collections, operations and maintenance / repair activities.
2	Can you utilise Possessions or Line Blockages?
3	Can we select machines and methodologies that eliminate or reduce the risk of fouling an open line?
4	Can we reduce the number of activities that are to be with carried out with ALO?
5	Is there a solution which keeps the activities, machine and load as far away from an open line as possible?
6	Consider the dangers of fouling an open line whilst manoeuvring on the RRAP; transit moves and delivery operations.
7	Consider the machine counterweight fouling any open line.
8	Do we understand the restrictions listed on the infrastructure manager approvals e.g. (NR) ECC, EAC and (TfL/LU) Plant Approvals certificate for on-tracking / travelling / working ALO?
9	Consider the movement of any load fouling a line open to traffic such as lifting rails etc How will the load be secured and stabilised effectively?
10	Have we planned to check the safety devices before use?
11	Have we got a system in place to prevent safety devices from being overridden?
12	Have we surveyed the site/ ground conditions? Do we understand how these conditions may affect stability during ALO Working?
13	Have we checked the route for travelling / transit moves?
14	Have we considered the requirement of any lift plans when designing the safe system of work and controls?
15	Have we assessed the impact of machines travelling through S&C on the kinematic envelope?
16	Can the machine driver configure the machine for travelling mode?
17	The minimum permissible Planned Separation should be calculated and the safe system of work tested to those limits prior to the work commencing.
18	Have we considered the reduction in operating speeds/ cycle times when selecting a high performance MLD?

Appendix C - Template forms

- ALO Coordinator Checklist
- ALO Change Control Checklist
- ALO Management Assurance Checklist

ALO Coordinator Site Checklist

This document is to be completed by the person responsible for testing, implementing & monitoring the ALO measures on site. By completing the checklist and signing the declaration below you are confirming that you are trained and competent to supervise ALO activities

Section 1 : Site Details

Date:	Location of Work:
Project Name:	ALO Authorisation No:

Should you answer NO to ANY of these questions, ALO working must not commence until change control has been implemented.

Section 2 : On Site Checklist

Have you received and been briefed on the approved ALO Work Plan?	Yes	No
Comments		
Do site works match with the ALO Work Plan?	Yes	No
Comments		
Has the ALO Work Plan been proven / tested prior to work commencing?	Yes	No
Comments		
Does plant and attachments match that recorded in the ALO Work Plan and any SSoW documentation?	Yes	No
Comments		
Are all control measures, as defined in the ALO Work Plan, fully implemented?	Yes	No
Comments		
Are you satisfied that the work can commence safely?	Yes	No
Comments		

Section 3 : Declaration

By signing this ALO Coordinator Site Checklist, you are confirming that you have tested and implemented the approved ALO Plan

Print Name:	
Signature :	
Date:	

Any Line Open (ALO) Change Control

Please refer to M&EE COP0032 Any Line Open (ALO) Working and the ALO Change Control Flow Diagram for guidance

Section 1 : Site Details

Date:

Location of Work:

Project Name:

ALO Authorisation No:

Section 2 : Change Control

To be completed by the ALO coordinator implementing & monitoring the ALO measures on site

PLANNED Control measures

PROPOSED Control measures

Reason for change - a detailed reason for the change control i.e. ALO work plan contains errors, or the inclusion removal or alteration of :- work type, methodology, location, plant type, possession arrangements, control measures

Proposed revised methodology of Work (including Work limits, and all distances to open running line) - a detailed description of the proposed methodology (including the attachment of a diagram to this document is applicable).

Section 3 : Authorisation Questions

To be completed by the ALO coordinator implementing & monitoring the ALO measures on site who should obtain guidance from a member of the senior on site management or on-call senior management.

Have you ensured that risk control measures are in place for the PROPOSED ALO activity and these have been recorded in section 2 of this document?	Yes	No
--	-----	----

Comments

Has a member of the senior on site management or on-call senior management reviewed and agreed, by way of a unique authorisation number, the proposed change?	Yes	No
---	-----	----

Comments

Revised unique authorisation number:

A Revised ALO Site Checklist must be completed following authorisation of this Change Control

You MUST monitor the work activity for on-going compliance.

Section 4 : Declaration

By signing this ALO Change Control Document, you are confirming that you have SAFELY REVISED a change control for ALO working which has been reviewed and authorised by an ALO Responsible Manager, and is ready for implementation

Print Name:	
Signature :	
Date:	

Any Line Open (ALO) Management Assurance Checklist

All ALO working inspection documents MUST be filed for auditing purposes. For further guidance and practice please see M&EE COP0032 Code of Practice for Any Line Open (ALO) Working.

Section 1 : Site Details

Date:	Location of Work:
Project Name:	ALO Authorisation No:

Should you answer NO to ANY of these questions, ALO working must not commence until change control has been implemented.

Section 2 : ALO Working Inspection Checklist

Does the person responsible for testing, implementing and monitoring the ALO measures on site have a copy of the ALO Work Plan?	Yes	No
Comments		
Can the responsible person demonstrate that this plan matches with the on-site work?	Yes	No
Comments		

Section 3 : Site Staff Briefing and demonstration of Understanding

Verify (through Q&A) that the following personnel have received a briefing on the ALO Work Plan and understand the ALO Control Measures as detailed in this Plan. You should also confirm that a test of these control measures has been completed prior to work commencing.

Role	Briefing & Understanding		System Test Carried Out		Comments
Person Responsible for testing, implementing & monitoring ALO measures on site.	Yes	No	Yes	No	
Banksman (for construction sites)	Yes	No	Yes	No	
Machine Controller / Crane Controller	Yes	No	Yes	No	
Machine Operator	Yes	No	Yes	No	
Slings	Yes	No	Yes	No	
Any other staff	Yes	No	Yes	No	

Section 4 : Further Questions

Please answer the following questions by detailing some of the observations you have made whilst on site.

Are the personnel who are operating and managing plant complying with the control measures that are identified in the ALO Work Plan?

Observations & Comments

Are the personnel who are managing and operating RRVs utilising duplex communication equipment to control plant movements?

Observations & Comments

Is the person responsible for testing, implementing & monitoring the ALO Control Measures ACTIVELY monitoring the implemented control measures for ALO working?

Observations & Comments

Are you satisfied that the ALO Control Measures are adequate to protect the safe passage of trains on open lines?

Observations & Comments

Section 5 : Declaration

By signing this ALO Management Assurance Checklist, you are confirming that you have observed activities related to ALO Working on site and have completed the inspection above.

Print Name:

Role / Position

Signature :

Date: