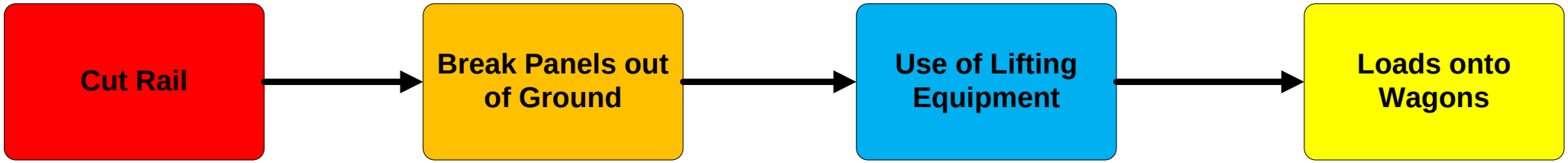
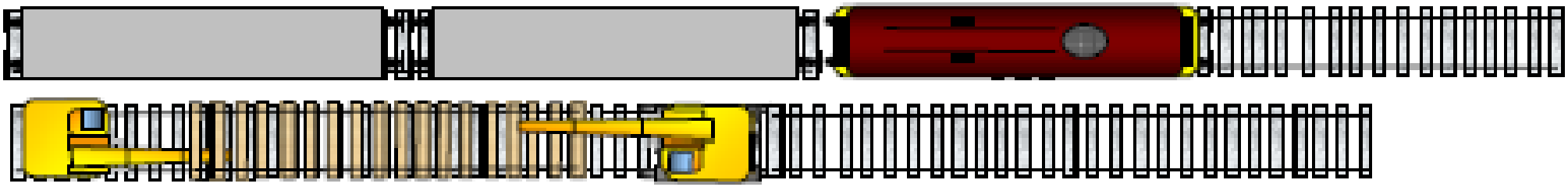
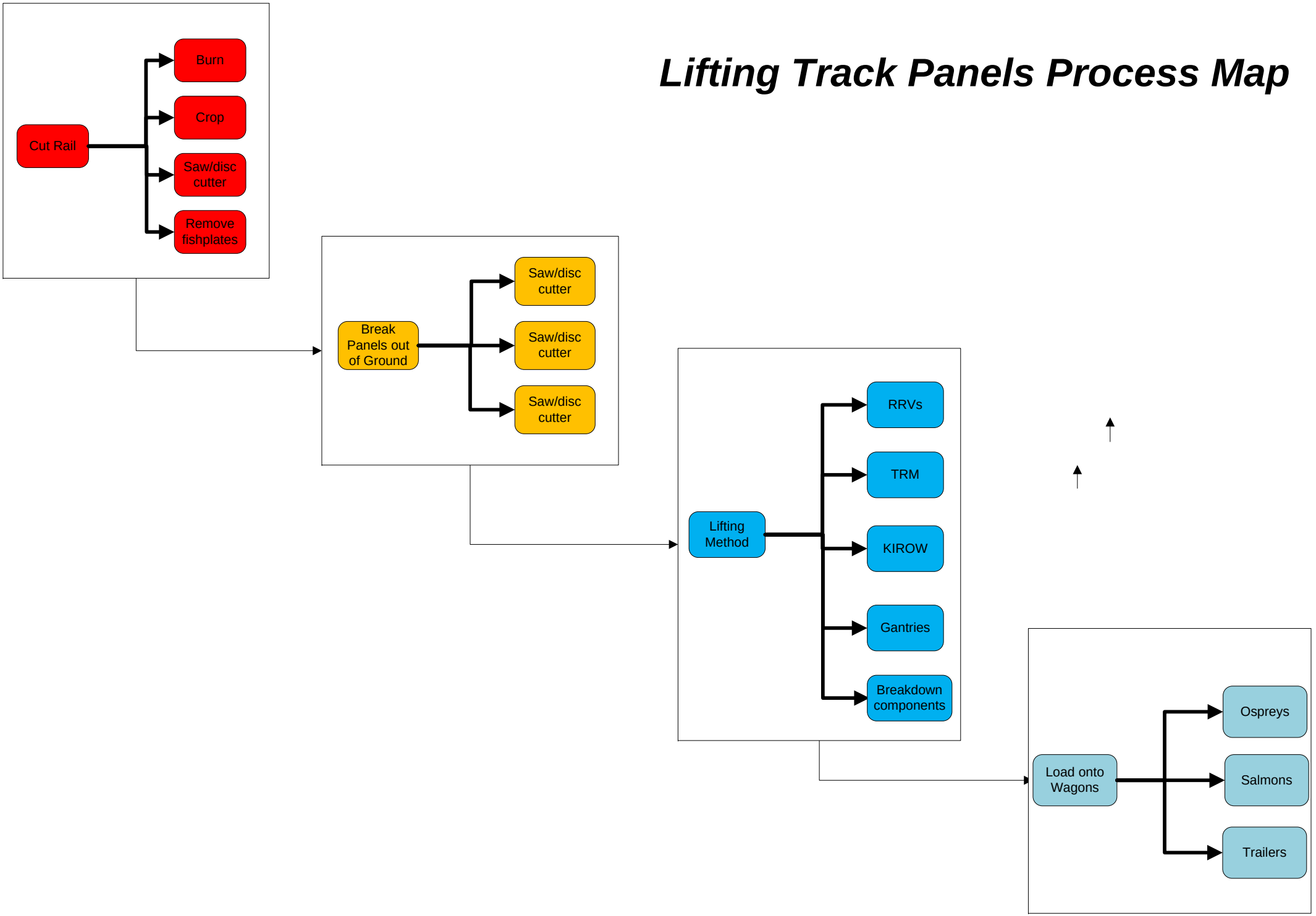
Lifting Track Panels Process Map - Overview





TLWG – Sub Group

Lifting Track Panels Process Map



Cut Rails

Method 1 – Burn Rails

Advantages: Quick.

Disadvantages: Hot work, control, verticality, gas, transporting sometimes not cut right through, bottles, manual handling.

Method 2 – Crop Rails

Advantages: Quick.

Disadvantages: Cost of extra Plant, lack of accuracy of cut, heavy (cropper)

Method 3 – Saw/Disc Cutter

Advantages: Light weight.

Disadvantages: Slow, first panel has to be burnt

Method 4 – Remove Fishplates

Advantages: Quick.

Disadvantages: Limited to jointed track

Remove Panels from the Ground

Method 1 – Jacks

Advantages: Light weight, low cost, greater lift force, failsafe

Disadvantages: Transportation, safe working – injuries to hands, misuse.

Method 2 – Lifter/Slewer

Advantages: Self propelled.

Disadvantages: Cost, craned onto site, unconsolidated ballast if on same line

Method 3 – Panel Grabs

Advantages: Supplied for process – not additional

Disadvantages: Risk of overloading, failure of lifting accessories,

Note: Breakout Load Unknown - compliance with LOLER difficult to demonstrate

Lifting Method - RRVs

Method 1 – One in the dig one on track

Advantages: Improved reach of machine in the dig

Disadvantages: Reduced machine stability of machine off-track driving over uneven beds

Method 2 – Both On Track

Advantages: Maximum machine stability.

Disadvantages: Radius influenced by track interval.

*Method 3 – One in the dig and one straddling**

Advantages: Improved reach of both machines

Disadvantages: Reduced machine stability. Tyre damage in high cant areas. Travelling over uneven beds/sleepers

*Method 4 – Both straddling**

Advantages: Improved reach of both machines

Disadvantages: Reduced machine stability. Tyre damage in high cant areas. Travelling over uneven beds/sleepers

* exceeds sleeper point loading (NR/L2/RMVP/0206)

Method 1 – RRVs: One in the dig one on track

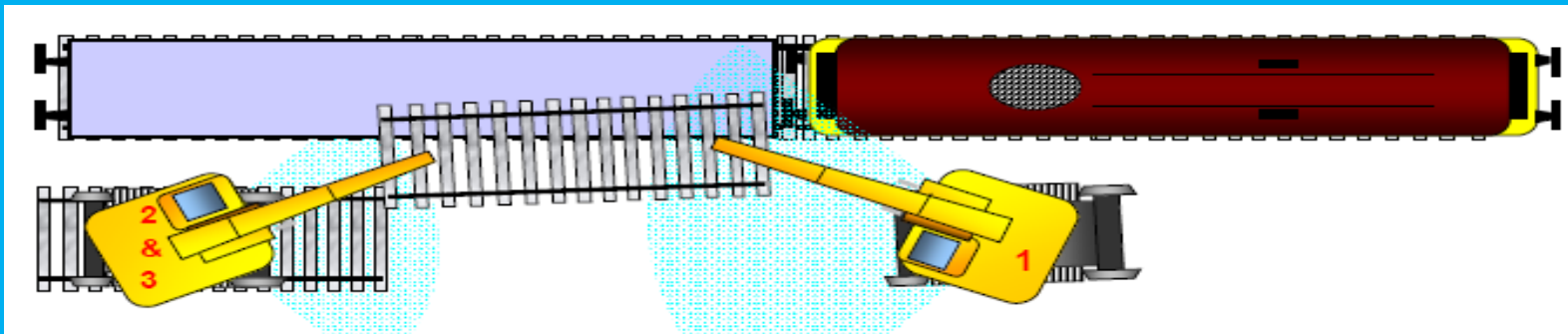
		Achievable radius at 45^0		
		6.0m	*6.5m*	*7.0m*
Number of machines available for compliant lifting in road mode	=	*74*	*20*	*4*
Number of machines available for compliant lifting on 0 – 50mm cant	=	*20*	*2*	*2*
Number of machines available for compliant lifting > 50mm cant	=	*6*	*0*	*0*

Potential Developments

1. Develop a crawler equivalent machine for working in similar pairs of machines TL

1a. Road Rail Crawler
1b. Road Crawler – need transportation method (currently no suitable rail vehicles/trailers are available) – reduced cost than 1a.

2. 'Motion cut' and TL mode on RCI on both machines through wireless link is likely to remove the need for similar machines (M&EE COP 008 – NR/L2/RMVP/0203. Note: would require deviation)



Method 2 – RRVs: Both Machines on Track

		Achievable radius at 45^0		
		6.0m	*6.5m*	*7.0m*
Number of machines available for compliant lifting on 0 – 50mm cant	=	*20*	*2*	*2*
Number of machines available for compliant lifting > 50mm cant	=	*6*	*0*	*0*

Potential Developments

1. Develop a crawler equivalent machine for working in similar pairs of machines TL

1a. Road Rail Crawler

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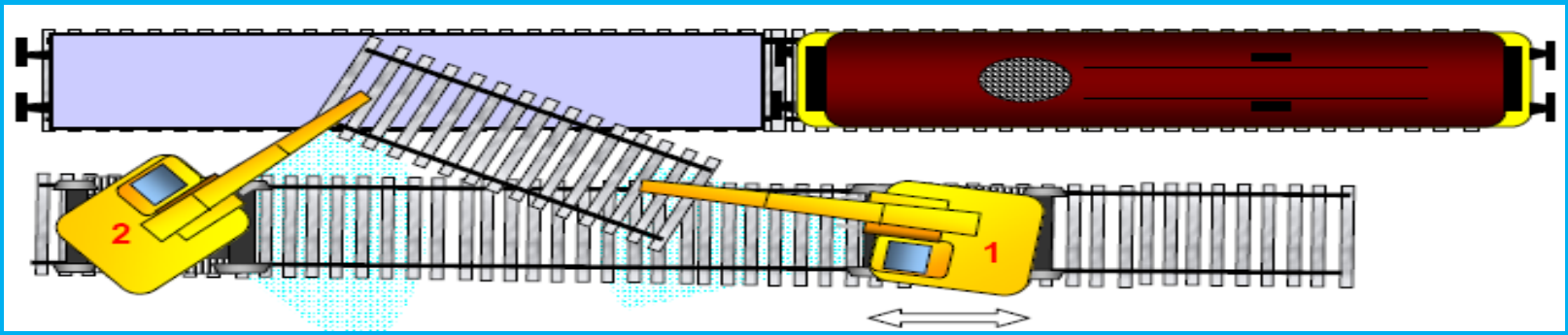

Method 3 – RRVs: one in the dig & one straddling

		Achievable radius at 45^0		
		6.0m	*6.5m*	*7.0m*
Number of machines available for compliant lifting on level ground	=	*74*	*20*	*4*
Number of machines available for compliant lifting on slope	=	*?*	*?*	*?*

Potential Developments

1. Develop a crawler equivalent machine for working in similar pairs of machines TL

1a. Road Rail Crawler

1b. Road Crawler – need transportation method (currently no suitable rail vehicles/trailers are available) – reduced cost than 1a.

2. 'Motion cut' and TL mode on RCI on both machines through wireless link is likely to remove the need for similar machines (M&EE COP 008 – NR/L2/RMVP/0203. Note: would require deviation)

3. Explore the easement of sleeper point loading restriction

Method 4 – RRVs: Both straddling

		Achievable radius at 45^0		
		6.0m	*6.5m*	*7.0m*
Number of machines available for compliant lifting on level ground	=	*74*	*20*	*4*
Number of machines available for compliant lifting on slope	=	*?*	*?*	*?*

Potential Developments

1. Develop a crawler equivalent machine for working in similar pairs of machines TL

1a. Road Rail Crawler

1b. Road Crawler – need transportation method (currently no suitable rail vehicles/trailers are available) – reduced cost than 1a.

2. 'Motion cut' and TL mode on RCI on both machines through wireless link is likely to remove the need for similar machines (M&EE COP 008 – NR/L2/RMVP/0203. Note: would require deviation)

3. Explore the easement of sleeper point loading restriction

Method 5 – Breakdown of Components

Advantages: Does not require Lifting Equipment with large capacity, speed, long length of rails can be recovered.

Disadvantages: Rail to be disposed of later, damage to sleepers and unlikely to be reused,

Note: requires different type of wagons

Lifting Method - TRMs

Method 1 – Lifting Panels

Advantages: Designed for the operation under OLE and adjacent live line and able to load Ospreys.

Disadvantages: Requires to use adjacent line to the line being relayed, requires separate haulage in areas of long length of line without crossovers, lifting bales require manual release therefore require modification for WAH and limited availability (24 in UK). Current reliability issues.

Note: there may be a need to introduce or provide a slew/boom extension limiter to prevent fouling the third line.

Lifting Method - Gantries

Method 1 – Lifting Panels

Advantages: Can relay on single lines.

Disadvantages: Require 10 foot rails to be in place and lack of availability

Lifting Method - Kirow

Method 1 – Lifting Panels

Advantages: Can lift 60 foot panel and load onto Osprey and relay/ load over-end, can work in the centre and load/unload two other lines..

Disadvantages: Lack of availability, criticality of operation do to only one machine/contingency

Loading onto Wagons - Ospreys

Advantages: Designed to load 30 and 60 foot panels preventing WAH

Disadvantages: Height load has to be lifted to get over the stanchions, sleeper spacing is critical when loading to meet the loading standard,

Salmons

Advantages: Designed to load 60 foot panels irrespective of sleeper spacing

Disadvantages: Requires WAH and none available.

Trailers

Advantages: Low load height, does not require a train to haul

Disadvantages: Can only be moved on site and has to be left in a location for disposal later.