

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

Module

Additional Methods

For endorsement, authorisation and issue record of this document, please refer to the SSI Applications Manual Contents, NR/L2/SIG/17002.

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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London. NW1 2DN.



Ref:	SSI8003-65E
Issue:	6
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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – No variations, could stop the railway

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – Controlled variations, approved risk analysis and mitigation

- **Amber requirements shall** be complied with unless variation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Variations **may** be permitted. Variations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** variations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – Guidance

Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.

Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.

Guidance is **not mandatory** and is not monitored for compliance.

Alternative solutions may be used. Alternative solutions do not need to be formally approved.

Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

Issue record

Issue	Date	Comments
4	04/12/2010	4 th Issue
5	03/03/2012	5 th Issue
6	05/09/2015	Error in clause 4.3.3 'PRR File' corrected.

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 06/12/2015.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

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Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

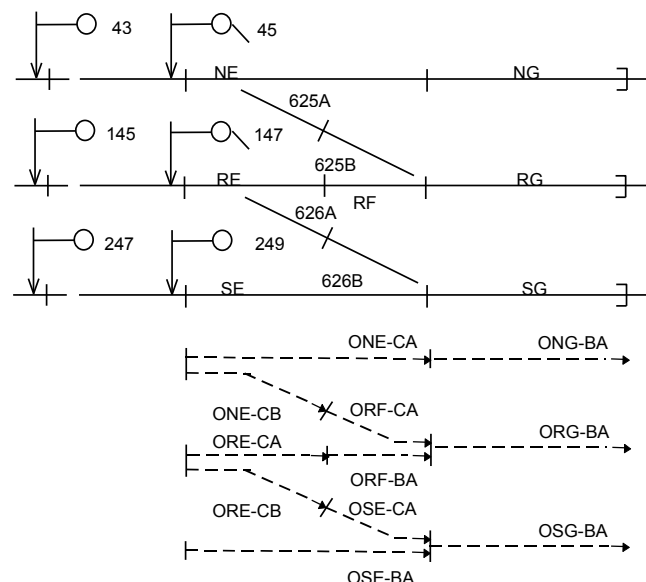
Contents

1 Parallel Overlaps	5
1.1 Integral Parallel Overlap Swinging	5
1.2 Swinging a Parallel Overlap First	8
2 Swinging an Overlap onto Facing Points	11
3 Potentially Opposing Overlaps	15
3.1 Simple Example	16
3.2 More Complicated Example	19
4 Swinging Restricted and Full Overlaps	28
4.1 Principles	28
4.2 Overlaps Not Coinciding	30
4.3 Overlaps Coinciding - Functions in Common Overlap	34
4.4 Overlaps Coinciding - No Functions in Common Overlap	37
4.5 Extra Track Section After Hinge Points in Restricted Overlap	39
4.6 Defensive Data	41
5 Swinging an Overlap Across an Interlocking Boundary	41
5.1 PFM File Data	43
5.2 Setting the Swinging Overlap	45
5.3 Swinging the Overlap Across the Boundary	47
5.4 Swinging the Overlap So It No Longer Crosses the Boundary	54
5.5 Releasing the Overlap Across the Boundary	61
5.6 Aspect Controls	62
6 Swinging Overlaps Through a Crossover With Split Detection	62
7 Locking Overlap Hinge Points in the Event of a SPAD	64

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

1 Parallel Overlaps

This Section deals with the swinging of parallel overlaps that would otherwise conflict with route setting or keying of hinge points. This demonstrates both swinging such overlaps integrally with these functions, and, where warranted through data complications, swinging the conflicting overlap(s) away before carrying out the function proper. This latter option expands on the method shown in Chapter D Section 1.3. The layout used to demonstrate these methods follows:



Note that the aspect control data for all routes through points 625 reverse should confirm that the conflicting overlap over 626 points has been swung clear at or before time of clearing. See Section 3.5 of [SSI8003-65](#) Chapter B.

1.1 Integral Parallel Overlap Swinging

All the overlap controls need to be identified to confirm that they are included in the data. The various categories are shown below starting with those that directly affect the points involved.

Overlap locking data required for points 625 & 626 in the PFM file is derived from the following controls (the implications of these controls on route setting are shown later).

Locking of trailing points in the overlap:

- (A) The overlap beyond signal 249 locks points 626N.
- (B1) The overlap beyond signal 147 via points 626N locks points 625N. With this first method, this locking is effective if it is not possible to swing this overlap via crossover 626N to R.

Overlaps are not permitted to be swung onto occupied track sections:

- (C) With an overlap present beyond signal 45, points 625N to R requires track section RG clear.
- (D) With an overlap present beyond signal 45, points 625R to N requires track section NG clear.

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

- (E) With an overlap present beyond signal 147, points 626N to R requires track section SG clear.
- (F) With an overlap present beyond signal 147, points 626R to N requires track sections RF & RG clear.

Overlaps are not permitted to be swung unless points (usually trailing) in the new overlap are controlled or free-to-move to the required position:

- (G1) With an overlap present beyond signal 147, points 626R to N requires points 625 already N or free to go N. This is a corollary of (B1).

The data shown **bold** in the following PFM file data for points 625 & 626 provides this points locking.

```
*P625N
  TNE c , TRF c
  URF-CA f
  ( ORF-CA f or TNG c ) / (D)
\

*P625R
  TNE c , TRF c ( TRE c or P626 cdr )
  UNE-CA f , URF-BA f
  ( ORF-BA f or P626 rf , ~QP625QR ) / (B1)
  ( ONE-CA f or TRG c ) / (C)
\

*P626N
  TRE c , TSE c
  USE-CA f
  ( OSE-CA f or TRF c , TRG c , P625 cnf ) / (F) & (G1)
\

*P626R
  TRE c , TSE c ( TRF c or P625 cdr )
  URF-BA f , USE-BA f
  OSE-BA f / (A)
  ( ORF-BA f or TSG c ) / (E)
\
```

Associated with the tests in the above points locking are commands to control these points to the position required. As such commands will potentially swing overlaps then these commands will take the form of "carry out commands at" lists as already explained in Chapter B. These lists will not only swing the overlaps associated with these points but will also swing away any parallel overlaps.

Such conflicting parallel overlaps that will have to be swung away are now identified.

- (H1) An overlap beyond signal 45 via points 625R will have to be swung away if an overlap beyond signal 147 via points 626R has to be swung via points 626N. This swinging of the latter overlap will be initiated by any function that requires points 626N, i.e. 626 point keying or the setting of routes 247 or 249. This is implemented in "carry out commands at" list P626QN below by command @P625QN if the latter overlap is present. The associated test is (G1) above.
- (J1) An overlap beyond signal 147 via points 626N will have to be swung away if points 625 are required R. This swinging of the overlap will be initiated by any

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

function that requires points 625R, i.e. 625 point keying or the setting of route 45B. This is implemented in "carry out commands at" list P625QR below by the added conditional statement wherein command @P626QR is only processed if the this overlap is present and points 625 are not already controlled reverse. Note the position of this conditional statement such that this overlap is swung before that beyond signal 45 (if present). The associated test is (B1) above.

The "carry out commands at" lists for these points now follow:

```
*P625QN
  if ONE-CB l , P625 xcn
  then ONE-CB f , ONE-CA l , ONG-BA l
    if P625 dr then EP625 = 0 \
  \
  P625 cn
\

*P625QR
  if ORE-CA l then @P626QR \
  if ONE-CA l , P625 xcr
  then ONE-CA f , ONE-CB l , ORF-CA l , ORG-BA l
    if P625 dn then EP625 = 0 \
  \
  P625 cr
\

*P626QN
  if ORE-CB l , P626 xcn
  then @P625QN
    ORE-CA f , ORE-CA l , ORF-BA l , ORG-BA l
    if P626 dr then EP626 = 0 \
  \
  P626 cn
\

*P626QR
  if ORE-CA l , P626 xcr
  then ORE-CA f , ORE-CB l , OSE-CA l , OSG-BA l
    if P626 dn then EP626 = 0 \
  \
  P626 cr
\
```

All requests for the setting of forward routes, i.e. those from signals 45, 147 & 249, that for route 247 and all requests for keying these points, utilise these "carry out commands at" lists.

Note that the tests for "overlap set" for overlap swinging purposes test the sub-overlap at the hinge points for being locked. A different sub-overlap may be tested for the same overlap locking free, typically at a crossover where the later sub-overlap is tested for being free. As an example compare the test above on "ONE-CB l" with the test on "ORF-CA f" in the earlier PFM file data.

Also note that the defensive measure of a test for "points not controlled" has to be included, as explained in Chapters B & C. However, this test is not necessary in the

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

first conditional statement in “carry out commands at” list P625QR as this is swinging an overlap via a different set of points.

The setting of the routes with facing points in their overlaps utilise OLxxxA and OLxxxQ “carry out tests/commands at” lists in the standard manner. Setting of an overlap beyond signal 147 via points 626N requires points 625N (the associated data is shown in **bold** below). Note the use of a “carry out commands at” list to call points 625N as this will swing away the overlap beyond signal 45, if present.

These lists take the form:

```
*OL625A   if ( P625 cnf or P625 crf ) \

*OL625Q
  ( if P625 cr                               / via 625 already R
    then ONE-CB 1 , ORF-CA 1 , ORG-BA 1
    \
  or if P625 cnf                             / via 625N
    then P625 cn , ONE-CA 1 , ONG-BA 1
    \
  or @P625QR , ONE-CB 1 , ORF-CA 1 , ORG-BA 1 / via 625 called R
    )                                         / (calling 626 R if
required)
\

*OL626A   if ( P626 cnf , P625 cnf or P626 crf ) \

*OL626Q
  ( if P626 cr                               / via 626 already R
    then ORE-CB 1 , OSE-CA 1 , OSG-BA 1
    \
  or if P626 cnf , P625 cnf                 / via 626N
    then P626 cn , @P625QN , ORE-CA 1 , ORF-BA 1 , ORG-BA 1
    \
  or P626 cr , ORE-CB 1 , OSE-CA 1 , OSG-BA 1 / via 626 called R
    )
\
```

Note; **it is essential** that the added tests in the above “carry out tests at” lists OLxxxA are exactly equivalent to the added tests in their associated “carry out commands at” list OLxxxQ. This is explained in detail in Chapter D, Section 4.

1.2 Swinging a Parallel Overlap First

In the above Section, the presence of further points-free-to-move data tests (B1) & (G1) within the PFM file data may led to excessive data processing times. This can be resolved by the following changes.

Condition (B1) is changed to:

- (B2) The overlap beyond signal 147 via points 626N locks points 625N. This locking is unconditional, i.e. to release it other than by overlap cancellation requires this overlap swung away first.

Condition (G1) is changed to:

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

(G2) With an overlap present beyond signal 147, points 626R to N requires points 625N. Points 625 have to be called N before this overlap swung. This is a corollary of (B2).

The following changes, shown **bold**, are required in the PFM file data for points 625 & 626 in the previous section.

```
*P625R
  TNE c , TRF c ( TRE c or P626 cdr )
  UNE-CA f , URF-BA f
  f ORF-BA f or P626 rf , ~QP625QR ) / (B2B1)
  ( ONE-CA f or TRG c ) / (C)
\
```

```
*P626N
  TRE c , TSE c
  USE-CA f
  ( OSE-CA f or TRF c , TRG c , P625 cnenf ) / (F) & (G2G1)
\
```

The points “carry out commands at” lists associated with these tests will also need changing, as their functions for swinging away parallel overlaps will be reduced. Accordingly, (H1) & (J1) are changed, both from the third sentence onwards:

(H2) An overlap beyond signal 45 via points 625R will have to be swung away if an overlap beyond signal 147 via points 626R has to be swung via points 626N. This swinging of the latter overlap will be initiated by any function that requires points 626N, i.e. 626 point keying or the setting of routes 247 or 249. These functions will do this, if the latter overlap is currently set via points 626R, by calling points 625N first which will swing the former overlap away. The data associated with (H1) is no longer present in “carry out commands at” list P626QN below. The test associated with this revised list is (G2) above.

(J2) An overlap beyond signal 147 via points 626N will have to be swung away if points 625 are required R. This swinging of the overlap will be initiated by any function that requires points 625R, i.e. 625 point keying or the setting of route 45B. These functions will do this by calling points 626R first which will swing this overlap away. The data associated with (J1) is no longer present in “carry out commands at” list P625QR below. The test associated with this revised list is (B2) above.

The altered “carry out commands at” lists for these points now follow, with the changes shown in **bold** (note the added comments):

```
*P625QR
  if ONE-CA 1 then @P626QR \ / [J1]
  if ONE-CA 1 , P625 xcr
  then ONE-CA f , ONE-CB 1 , ORF-CA 1 , ORG-BA 1
    if P625 dn then EP625 = 0 \
  \
  P625 cr
\
/ An O/L beyond S45 via 625R is required to be swung away first. [J2]
```

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

```
*P626QN
  if ORE-CB 1 , P626 xcn
  then @P625QN / [H1]
    ORE-CB f , ORE-CA 1 , ORF-BA 1 , ORG-BA 1
    if P626 dr then EP626 = 0 \
  \
  P626 cn
\
/ Points 625 are required called N first if an O/L is set beyond S147. [H2]
```

Additions are now required in the route setting and point keying request data, as identified in (H2) & (J2). The effectiveness of these initial actions are checked by the subsequent existing points-free-to-move tests. Thus for (H2), if an overlap beyond signal 45 has not been swung away via points 625R to N, then the test (G2) in PFM file data list *P626N will prevent points 626 being called N if an overlap is set beyond 147 signal - thus the function will fail. Similarly for (J2), if an overlap beyond signal 147 has not been swung away via points 626N to R, then the test (B2) in PFM file data list *P625R will prevent points 625 being called R. - thus the function will fail.

In all cases, the usual route setting tests for route not barred by the Technician, no directly opposing route locking, and SGRC not applied (where applicable) shall be done before the points are called to swing an overlap away.

The data for these requests now follows with the additions shown in **bold**:

```
*QR45B
  if R45B a
    <no directly opposing route locking>
  then if ORE-CA 1 , P626 fr then @P626QR \ / (J2)
    if <other route availability tests>
      P625 crf
    then <usual route setting commands>
      @P625QR
  \
  \ .
```

```
*QR247
  if R247 a
    <no directly opposing route locking>
  then if ORE-CB 1 , P625 fn then @P625QN \ / (H2)
    if <other route availability tests>
      P626 cnf
    then <usual route setting commands>
      @P626QN
      OSE-BA 1 , OSG-BA 1
  \
  \ .
```

```
*QR249
  if R249 a , <no directly opposing route locking>
  then if ORE-CB 1 , P625 fn then @P625QN \ / (H2)
    if <other route availability tests>
      P626 cnf
    then <usual route setting commands>
      @P626QN
  \
  \ .
```

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

```

*QP625QR
  if E625KC < 5 , L625KR s
  then P625 xkn , P625 kr
      if ORE-CA 1 , P626 fr then @P626QR \
      if P625 crf then @P625QR \
  \
  E625KC = 5 , L625KR xs .

*QP626QN
  if E626KC < 5 , L626KN s
  then P626 kn , P626 xkr
      if ORE-CB 1 , P625 fn then @P625QN \
      if P626 cnf then @P626QN \
  \
  E626KC = 5 , L626KN xs .

```

A check has to be made for any immediate freeing of additional sub-overlaps that may be required. QR45B & QP625QR, both require ORF-BA to be immediately freed following the swinging of the overlap beyond signal 147 via points 626N to R. This allows the immediate freeing of overlap locking of points 625N, as explained in Chapter D Section 1.3. In this instance the testing of this sub-overlap's track section clear is not necessary as this is proved clear via the test on points 626 free to go R. The data command for freeing the sub-overlap is included, in the position shown, within "carry out commands at" list P626QR:

```

*P626QR
  if ORE-CA 1 , P626 xcr
  then ORE-CA f , ORE-CB 1 , OSE-CA 1 , OSG-BA 1
      if P626 dn then EP626 = 0 \
      ORF-BA f
  \
  P626 cr
  \

```

Other route setting or point keying data in the previous Section is unchanged, including the OLxxxA and OLxxxQ "carry out tests/commands at" lists.

2 Swinging an Overlap onto Facing Points

This Section covers alternative data methods of swinging an existing overlap such that the new overlap has to be set through a further set of facing points. This develops further the methods introduced in Chapter D Sections 1.2 & 1.3. As with these previous Sections, a reduction in points-free-to-move tests is achieved, this method then being further developed to allow the splitting of panel requests. This will apply to whatever function is swinging the overlap whether it be point keying or route setting.

The following method is based on attempting, in turn, to swing the overlap onto the further set of facing points via these points:

- already controlled R
- already controlled N or called N
- called R

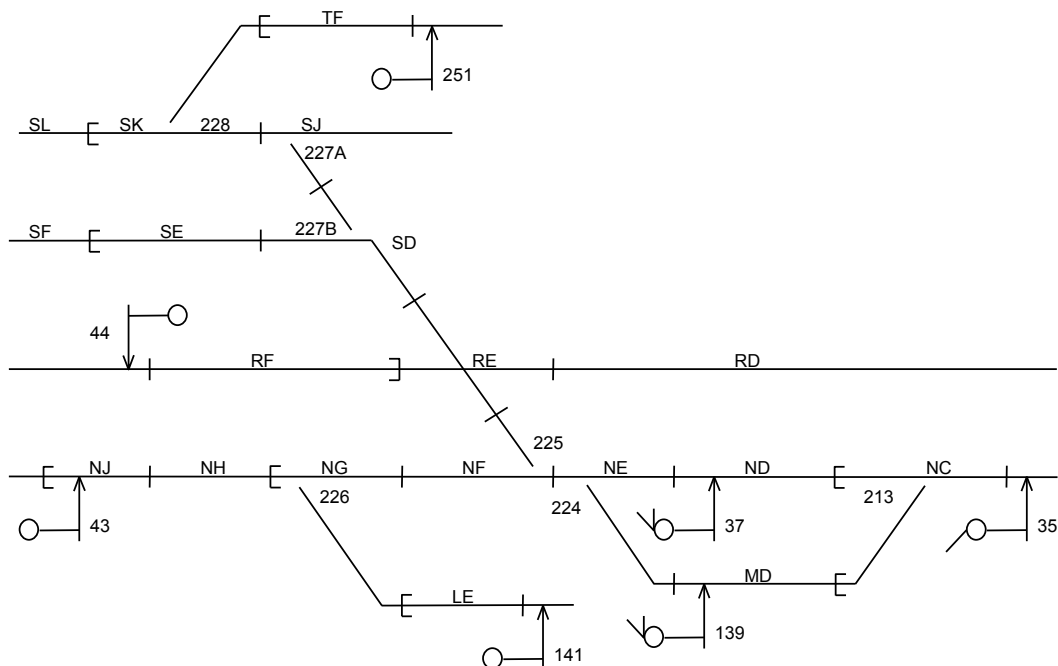
Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

If forward route setting is involved then the position of these points will be predetermined.

As demonstrated in Examples 3 & 4 in Chapter C, "carry out tests/commands at" lists OLxxxAC and OLxxxQS are normally used in establishing which way a swung overlap should be set through a further set of facing points "xxx". The first list, for checking overlap availability, is accessed via the PFM file data for the hinge points about which the overlap is being swung. The second list, for setting the swung overlap through the further set of facing points "xxx", is accessed by the "carry out commands at" list P<hinge_points>QN or QR used to control the hinge points to the new position. Thus these lists are processed when the availability tests and calling of the hinge points are carried out.

If the availability tests and calling of the points in the new part of the overlaps can be carried out before that of the hinge points then the points free to move tests in the "carry out tests/commands at" lists OLxxxAC and OLxxxQS will no longer be required, this leading to a reduction in the data processing time associated with these hinge points. The OLxxxAC list still checks that the new part of the overlap is available from points "xxx" inclusive but all the points are tested for merely being controlled in the required position. List OLxxxQS is now merely used to apply the new overlap locking and it is restructured accordingly, merely testing points xxx as to which way they are controlled. Note that the overlap locking in the new part of the overlap is still not applied until the hinge points are called.

"Carry out tests/commands at" lists OLxxxAC and OLxxxQS are used in Example 4 in Chapter C, and the data in this example is now changed to illustrate the method. The hinge points are 225, and via these points R the overlap extends to further points 227, i.e. "xxx". For convenience the layout diagram is repeated here:



The original data is shown first:

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

```

/ In the PFM file
*OL227AC
  if TSD c
    ( ~QR37C , ~QR139C , TSE c , P227 cnf
    or ~QR37B , ~QR139B , TSJ c , TSK c , P227 crf , P228 cnf
    )
  \

```

```

/ In the PRR file
*OL227QS
  ( if ~QR37B , ~QR139B , TSJ c , TSK c , P227 cr , P228 cnf
    then P228 cn , OSD-AC 1 , OSJ-BC 1 , OSK-BC 1
    \
    or if ~QR37C , ~QR139C , TSE c , P227 cnf
      then P227 cn , OSD-AB 1 , OSE-AB 1
      \
      or P227 cr , P228 cn , OSD-AC 1 , OSJ-BC 1 , OSK-BC 1
      )
  \

```

These two lists are changed to:

```

/ In the PFM file
*OL227AC
  if TSD c
    ( ~QR37C , ~QR139C , TSE c , P227 cn
    or ~QR37B , ~QR139B , TSJ c , TSK c , P227 cr , P228 cn
    )
  \

```

```

/ In the PRR file
*OL227QS
  if P227 cn
    then OSD-AB 1 , OSE-AB 1
    \
    else OSD-AC 1 , OSJ-BC 1 , OSK-BC 1
    \
  \

```

The data that uses these lists in calling points 225R, i.e. list *P225R in the PFM file and “carry out commands at” list P225QR in the PRR file (as amended by Chapter D Section 1.3 to swing the whole overlap first), is unchanged:

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

```
*P225R
  TNF c , TRE c
  UNF-AB f , URE-CA f
  ( ONF-AB f or @OL227AC )
\
/ Test to check alternative overlap available and clear, via 227 N or R
```

```
*P225QR
  if ONF-AB l , P225 xcr
  then ONF-AB f , ONF-AC l , ORE-BD l , @OL227QS
    if P225 dn then EP225 = 0 \
    if TNG c then ONG-AC f \      / free additional sub-overlap
  \
  P225 cr
\
```

Other “carry out commands at” lists associated with facing points "xxx", i.e. P227QN & QR, as used in Chapter D Section 1.3, are also unchanged.

All panel requests for route setting and point keying that can potentially swing the overlap through the further set of facing points "xxx", i.e. any employing the above associated “carry out commands at” list P<hinge_points>QN or QR (P225QR in this example), will need adapting to call the points in the new part of the overlap first before the route setting or point keying proper takes place.

This adaptation takes the form of additional data at the beginning of the request that, if the overlap is present, tests for the availability of the new part of the overlap from facing points "xxx" onwards and calls the associated parts. The panel request data for the points key calling of the hinge points in this direction in Example 4 has data added as follows. (This is typical for a panel controlled scheme; that data for an IECC controlled scheme is similarly changed.)

```
*QP225QR
  if E225KC < 5 , L225KR s
  then P225 xkn , P225 kr
    if ONF-AB l , TSD c
    then @OL227N&R      / call points in new O/L first
  \
  if P225 crf then @P225QR \
\
E225KC = 5 , L225KR xs .
```

```
*OL227N&R
  ( if P227 cr , P228 cnf , TSJ c , TSK c
    then P228 cn
  \
    / 227 already R
  or if P227 cnf , TSE c
    then P227 cn
  \
    / 227N
  or if P227 rf , P228 cnf , TSJ c , TSK c
    then P227 cr , P228 cn
  \
    / 227 called R
  )
\
```

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

In other instances the point commands may need changing to “carry out commands at” lists. If required, the request can be split into two or more parts, abandoning the use of the new “carry out commands at” list OL227N&R if necessary and splitting its contents.

Data for any flank routes is similarly changed. Thus the panel request data for setting route 141, as amended by Chapter D Section 1.3 to swing the whole overlap first, will become:

```
*QR141
  if R141 a , ONF-AB 1 , TSD c
  then @OL227N&R                               / call points in new O/L first
      if P225 fr
      then @P225QR                               / secondly swing overlap away
      \
  \
  if R141 a
    P226 crf
  then R141 s
    P226 cr
    ULE-AB 1 , UNG-BC 1 , UNH-AB 1 , UNJ-AB 1
    S141 clear bpull                             / finally set route
  \ .
```

Forward routes through this part of the overlap are also affected. They will require the facing points "xxx", plus any further points in particular positions. The route setting request data should be re-arranged such that these points are called (in reverse order as previously required) **before** the availability of the hinge points is tested. Thus the data for setting route 37C is changed to:

```
*QR37C
  if R37C a
    P228 cnf , P227 crf
  then P228 cn , @P227QR
    if P224 cnf , P225 crf
    then R37C s
      P224 cn , @P225QR
      UNE-AC 1 , UNF-AC 1 , URE-BD 1 , USD-AC 1 , USJ-BC 1
      USK-BC 1 , USL-AB 1
      S37 clear bpull
    \
  \ .
```

In all cases, the usual route setting tests for route not barred by the Technician, no directly opposing route locking, and SGRC not applied (where applicable) shall be done before the points are called to swing an overlap away.

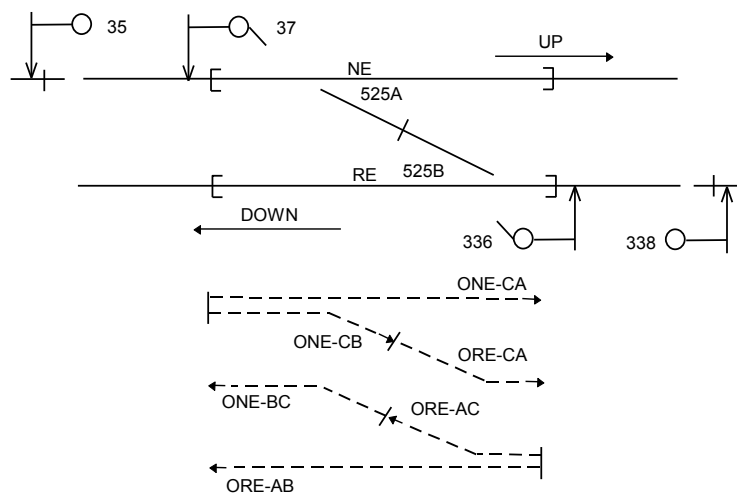
3 Potentially Opposing Overlaps

This Section deals with the swinging of overlaps that would otherwise directly oppose the setting of a route. First a simple layout is used to illustrate where any required swinging of existing opposing overlaps is done integrally with the route setting. Then a more complicated layout is used where it is more straightforward to swing certain existing opposing overlaps before route setting proper commences. This expands on the method shown in Chapter D Section 1.3.

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

3.1 Simple Example

This uses the diagram below.



All the overlap controls need to be identified to confirm that they are included in the data. Here the controls are simple.

Locking is required to prevent the overlaps beyond signals 37 & 336 being present simultaneously via points 525R. Thus points 525 shall be prevented from being controlled from N to R if both overlaps are present. The data shown **bold** in the following PFM file data for points 525 provides this locking.

```
*P525N
  TNE c , TRE c
  UNE-BC f , URE-CA f
\

*P525R
  TNE c , TRE c
  UNE-CA f , URE-AB f
  ( ONE-CA f or ORE-AB f )
\
```

Also, with an overlap present beyond signal 336 via points 525R, an overlap cannot be set beyond 37 signal until points 525 are controlled N. "Carry out tests/commands at" lists for setting this overlap, OL525AA & OL525AQ (see below), include tests on opposing sub-overlap ONE-BC such that where necessary points 525 are controlled R to N. This confirms that if points 525 are locked R by key or track section occupancy with an opposing overlap present then route setting will fail. Typical PRR data now follows for setting route 35:

```
*QR35
  if <usual route availability tests> , @OL525AA
  then <usual route setting commands> , @OL525AQ
\ .
```

The data for setting route 338 is similar, this having to cater for setting an overlap beyond signal 336 with an overlap present beyond signal 37 via points 525 reverse:

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

*QR338

```

if <usual route availability tests> , @OL525BA
then <usual route setting commands> , @OL525BQ
\ .

```

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

Because there are both up and down direction overlaps set through points 525, both 525A and 525B variants respectively of “carry out tests/commands at” lists OL525A & OL525Q are provided, used by the setting of routes 35 and 338 respectively. Thus the identified point end is that which is facing in the overlap. Note that within both the OL525Q lists, “carry out commands at” list P525QN is substituted for command “P525 cn” to swing an existing overlap. There is no need in this instance to similarly substitute “carry out commands at” list P525QR for command “P525 cr” as this is not swinging an existing overlap. These lists take the form shown below with the data features being demonstrated shown in **bold**:

```
*OL525AA    if ( P525 cnf or P525 crf , ONE-BC f ) \

*OL525AQ
  ( if P525 cr , ONE-BC f                / via 525 already R
    then ONE-CB 1 , ORE-CA 1
    \
  or if P525 cnf                / via 525 N
    then @P525QN , ONE-CA 1
    \
  or P525 cr , ONE-CB 1 , ORE-CA 1 / via 525 called R
  )
\

*OL525BA    if ( P525 cnf or P525 crf , ORE-CA f ) \

*OL525BQ
  ( if P525 cr , ORE-CA f                / via 525 already R
    then ORE-AC 1 , ONE-BC 1
    \
  or if P525 cnf                / via 525 N
    then @P525QN , ORE-AB 1
    \
  or P525 cr , ORE-AC 1 , ONE-BC 1 / via 525 called R
  )
\
```

Note; **it is essential** that the added tests in the above OL525A “carry out tests at” lists are exactly equivalent to the added tests in their associated OL525Q “carry out commands at” list. This is explained in detail in Chapter D, Section 4.

“Carry out commands at” lists P525QN and P525QR also have to cater for swinging either direction overlaps and further “carry out commands at” lists are provided within to minimise data processing time.

Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

```

*P525QN
  if ( ONE-CB 1 or ORE-AC 1 ) P525 xcn
  then @525QNOL                                     / Overlap present
  \
  P525 cn
\

*525QNOL
  if ONE-CB 1
  then ONE-CB f , ONE-CA 1                         / Swing up overlap
  else ORE-AC f , ORE-AB 1                         / Swing down overlap
  \
  if P525 dr then EP525 = 0 \
\

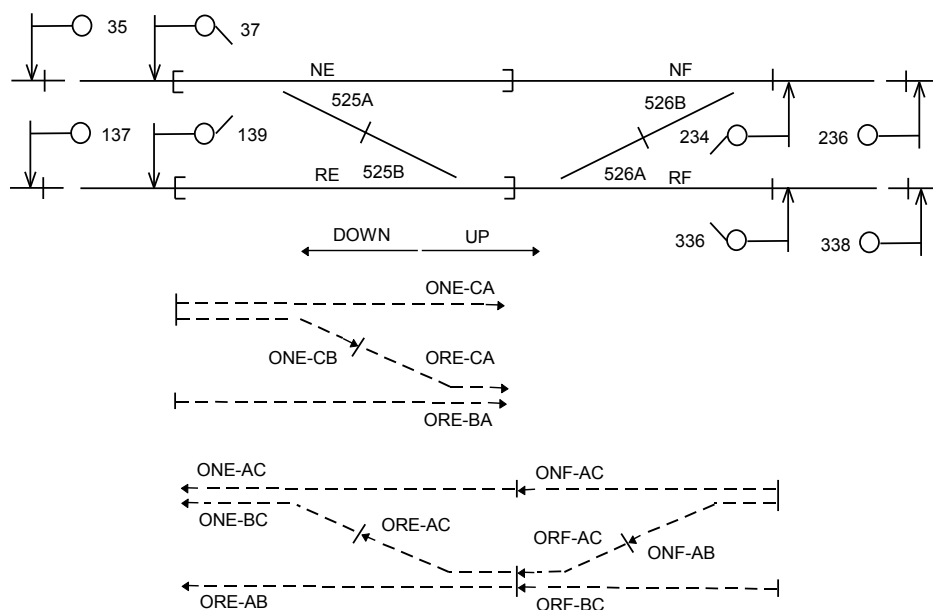
*P525QR
  if ( ONE-CA 1 or ORE-AB 1 ) P525 xcr
                                     / Overlap present
  then @525QROL
  \
  P525 cr
\

*525QROL
  if ONE-CA 1
  then ONE-CA f , ONE-CB 1 , ORE-CA 1
                                     / Swing up overlap
  else ORE-AB f , ORE-AC 1 , ONE-BC 1
                                     / Swing down overlap
  \
  if P525 dn then EP525 = 0 \
\

```

3.2 More Complicated Example

A more complicated example now follows, using the diagram below (the previous Section should have been understood first).



Ref:	SSI8003-65E
Issue:	6
Date:	05/09/2015
Compliance date:	06/12/2015

As with the previous example, all the overlap controls need to be identified to confirm that they are included in the data. However, because the controls are no longer simple, a more structured approach is required. The various categories are shown below starting with those that directly affect the points involved.

Overlap locking data required for points 525 & 526 in the PFM file is derived from the following controls (the implications of these controls on route setting is shown later).

First the locking of trailing points in the overlaps is examined:

- (A) The overlap beyond signal 139 locks trailing points 525N.
- (B) The overlap beyond signal 336 locks trailing points 526N.
- (C) The overlap beyond signal 234 via points 526N locks trailing points 525N. Also, the overlap beyond signal 234 via points 526R shall not be set via points 525R. Thus any overlap beyond signal 234 locks points 525N.

Then considering each pair of opposing overlaps in turn:

- (D) Overlaps beyond signals 37 & 336 shall not be present together if points 525 are R. Thus points 525 shall be prevented from being controlled from N to R if both these overlaps are present.
- (E) Overlaps beyond signals 139 & 234 shall not be present together if points 526 are R. Thus points 526 shall be prevented from being controlled from N to R if both these overlaps are present.
- (F) Overlaps beyond signals 37 & 234 can only be present together if points 525 are N and points 526 are R. Thus points 526 shall be prevented from being controlled from R to N if both these overlaps are present. (C) above holds points 525N.
- (G) Overlaps beyond signals 139 & 336 simply cannot be present together but this has no effect on point locking.

Overlaps are not permitted to be swung onto occupied track sections:

- (H) With an overlap present beyond signal 234, points 526N to R requires track section RE clear and points 526R to N requires track section NE clear.

In other instances overlap swinging will require certain points in the new overlap to be set to a required position - this does not arise here (the overlap beyond signal 234 requires points 525N irrespective of whether points 526 are N or R).

The data shown **bold** in the following PFM file data for points 525 & 526 provides this points locking.