# TURNOUT DETAILED INSPECTION

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Location: Track: Equipment No.: | | | | | | | | | | | | | | | | | | | | | | | |
| Kilometrage: Date: | | | | | | | | | | | | | | | | | | | | | | | |
| Ellipse Job.: TURN01 Ellipse Work Order No.: | | | | | | | | | | | | | | | | | | | | | | | |
| Type of turnout being inspected (circle answer):  i) non-tangential, ii) tangential, iii) undercut switch / heavy duty switch and joggled stock rail | | | | | | | | | | | | | | | | | | | | | | | |
| Points | | | | | | | Measure | | | Response (all speed in km/h) | | | | | | | | | | | Comments | | | |
| Is there evidence of stock rail creep at switch? | | | | Left | | |  | | | Report any defects. | | | | | | | | | | |  | | | |
| Right | | |  | | | Report any defects. | | | | | | | | | | |  | | | |
| Are the points going to be reversed to allow inspection on both sides? | | | | | | |  | | | If no, highlight a reason why:   * Switch is currently clipped (booked out of use) * Active traffic running on adjacent line * Inspector not qualified to move points * No suspected defects via observation (Section 3) | | | | | | | | | | |  | | | |
| Gauge  (Measured at switch tip) | | | | | | |  | | | >1455 mm apply plain track geometry responses  1429 mm to 1427 mm speed 60/65 and monitor  1426 mm to 1425 mm speed 20/20 and monitor  <1425 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Width at Tip  (Closed switch only, as presented to the wheel)  (non-tangential, non-undercut switch only) | | | | Left | | |  | | | 4 mm to 6 mm monitor  7 mm to 8 mm speed 20/20 and monitor  >8 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Height at Tip (distance from running surface to top of switch)  (non-tangential, non-undercut switch only) | | | | Left | | |  | | | Conventional switch only:  >12 mm to <13 mm monitor  12 mm or less speed 10/10 and pilot trains  Undercut and asymmetric switches should not sit high of the machined section of stock rail. Report any defect. | | | | | | | | | | |  | | | |
| Switch Tip Wear Angle  (non-tangential, non-undercut switch only) | | | | Left | | |  | | | Angle from vertical. Report suspect angles:  18 to 26 degrees monitor  >26 degrees speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Stock Rail Wear Angle  (non-tangential, non-undercut switch only) | | | | Right | | |  | | | Angle from vertical. Report suspect angles:  18 to 26 degrees monitor  >26 degrees speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Width at Tip  (Closed switch only, as presented to the wheel)  (non-tangential, non-undercut switch only) | | | | Right | | |  | | | 4 mm to 6 mm monitor  7 mm to 8 mm speed 20/20 and monitor  >8 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Height at Tip (distance from running surface to top of switch)  (non-tangential, non-undercut switch only) | | | | Right | | |  | | | Conventional switch only:  >12 mm to <13 mm monitor  12 mm or less speed 10/10 and pilot trains  Undercut and asymmetric switches should not sit high of the machined section of stock rail. Report any defect. | | | | | | | | | | |  | | | |
| Switch Tip Wear Angle  (non-tangential, non-undercut switch only) | | | | Right | | |  | | | Angle from vertical. Report suspect angles:  18 to 26 degrees monitor  >26 degrees speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Stock Rail Wear Angle  (non-tangential, non-undercut switch only) | | | | Left | | |  | | | Angle from vertical. Report suspect angles:  18 to 26 degrees monitor  >26 degrees speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| **Tangential Turnouts - Manufacturer Specific Inspection Requirements. Complete Where Relevant.** | | | | | | | | | | | | | | | | | | | | | | | | |
| PRE Tangential Turnout | | | | | | |  | | | Broken slide baseplate jaws, broken slide tables. Detached or worn slide baseplate end stops. Record as defect and prioritise. | | | | | | | | | | |  | | | |
| TKL Tangential Turnout | | | | | | |  | | | Inner stock rail bracing clip legs not fitted to thrust abutments. Record as defect and prioritise. | | | | | | | | | | |  | | | |
| Vossloh Tangential Turnouts | | | | | | |  | | | IBAV not securely located in housing or housing incorrectly located against the foot of the stock rail at each slide plate. Record as defect and prioritise. | | | | | | | | | | |  | | | |
| VAE Tangential Turnouts | | | | | | |  | | | Damaged or broken switch inside fastening system pins and keys. Record as defect and prioritise. | | | | | | | | | | |  | | | |
| Martinus Tangential Turnouts. | | | | | | |  | | | Poor fitting or ineffective spring clip components for securing the stock rail inner foot to the switch slide chair. Record as defect and prioritise. | | | | | | | | | | |  | | | |
| Points | | | | | | | Measure | | | Response (all speed in km/h) | | | | | | | | | | | Comments | | | |
| Lever Effectiveness  (Manual Points) | | | | | | |  | | | Insufficient tension to keep switch closed under traffic  Report as defect and prioritise. | | | | | | | | | | |  | | | |
| Spreader Bar/Drive Rods | | | | | | |  | | | Missing/Broken – Notify signalling maintainer. Secure switch and/or impose 10/10 speed and pilot trains as appropriate. | | | | | | | | | | |  | | | |
| Are switches bearing evenly on slide plates for the entire length? | | | | | | |  | | | Report any defects. | | | | | | | | | | |  | | | |
| Open throw dimension (Switch blade open gap) | | | | Left | | |  | | | 85 mm to < 95 mm monitor  80 mm to < 85 mm speed 20/20 and monitor  <80 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Back of switch rail to stock rail (Flangeway throat gap) | | | | Left | | |  | | | 35 mm to <40 mm speed 40/40 and monitor  <35 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch/Stock rail contact area (amount of lipping) | | | | Left | | |  | | | Report if switch or stock rail need grinding and prioritise.    Report if switch or stock rail have lipping of 1mm or greater. This lipping should be ground. | | | | | | | | | | |  | | | |
| Switch blade closed gap | | | | Right | | |  | | | 1 mm to 3 mm record as defect, program adjustment  >3 mm record as defect, urgent attention | | | | | | | | | | |  | | | |
| Is there any observed damage to switch tips? | | | | | | |  | | | Report any defects. | | | | | | | | | | |  | | | |
| Switch Blade Damage  (deeper than 19mm from running surface of stock rail) | | | | Left | | |  | | | 100 mm to 199 mm long – monitor  ≥200 mm long - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Open throw dimension (Switch blade open gap) | | | | Right | | |  | | | 85 mm to < 95 mm monitor  80 mm to < 85 mm speed 20/20 and monitor  <80 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Back of switch rail to stock rail (Flangeway throat gap) | | | | Right | | |  | | | 35 mm to <40 mm speed 40/40 and monitor  <35 mm speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch/Stock rail contact area (amount of lipping) | | | | Right | | |  | | | Report if switch or stock rail need grinding and prioritise.    Report if switch or stock rail have lipping of 1mm or greater. This lipping should be ground. | | | | | | | | | | |  | | | |
| Switch blade closed gap | | | | Left | | |  | | | 1 mm to 3 mm record as defect, program adjustment  >3 mm record as defect, urgent attention | | | | | | | | | | |  | | | |
| Switch Blade Damage  (deeper than 19mm from running surface of stock rail) | | | | Right | | |  | | | 100 mm to 199 mm long – monitor  ≥200 mm long - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Heel Blocks  (includes fixed, pivot heel and stress transfer blocks) | | | | Left | | |  | | | Cracked: 23 tonne axle load speed 80/90, 25 tonne speed 60/65, 30 tonne speed 40/40.  Broken but effective – 40/40 speed and monitor.  Missing/Broken ineffective – speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Heel Blocks  (includes fixed, pivot heel and stress transfer blocks) | | | | Right | | |  | | | Cracked: 23 tonne axle load speed 80/90, 25 tonne speed 60/65, 30 tonne speed 40/40.  Broken but effective – 40/40 speed and monitor.  Missing/Broken ineffective – speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Creep Control Blocks | | | | Left | | |  | | | Missing/Broken ineffective - monitor | | | | | | | | | | |  | | | |
| Creep Control Blocks | | | | Right | | |  | | | Missing/Broken ineffective - monitor | | | | | | | | | | |  | | | |
| Rail Brace/Chair | | | | Left | | |  | | | Cracked/Loose – monitor  Broken/Ineffective:  1 only – monitor except for 60/65 speed 25 tonne, 40/40 speed 30 tonne axle load areas.  2 consecutive – speed 60/65 except for 40/40 speed in 25 or 30 tonne axle load areas.  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Rail Brace/Chair | | | | Right | | |  | | | Cracked/Loose – monitor  Broken/Ineffective:  1 only – monitor except for 60/65 speed 25 tonne, 40/40 speed 30 tonne axle load areas.  2 consecutive – speed 60/65 except for 40/40 speed in 25 or 30 tonne axle load areas.  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Bearing Stops | | | | Left | | |  | | | Cracked/Loose – monitor  Broken/Ineffective:  1 only – monitor except for 60/65 speed 25 tonne, 40/40 speed 30 tonne axle load areas.  2 consecutive – speed 60/65 except for 40/40 speed in 25 or 30 tonne axle load areas.  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Switch Bearing Stops | | | | Right | | |  | | | Cracked/Loose – monitor  Broken/Ineffective:  1 only – monitor except for 60/65 speed 25 tonne, 40/40 speed 30 tonne axle load areas.  2 consecutive – speed 60/65 except for 40/40 speed in 25 or 30 tonne axle load areas.  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Ineffective Bearers/Fasteners  (In critical area) | | | | | | |  | | | 1 only – monitor  2 consecutive – speed 40/40 and monitor  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Bolts | | | | | | |  | | | Loose/Broken/Missing – record as defect and prioritise | | | | | | | | | | |  | | | |
| Crossing | | | | | | | Measure | | | Response | | | | | | | | | | | Comments | | | |
| Gauge  (At crossing nose) | | | | | Mainline | |  | | | ≥1443 mm - speed 20/20 and monitor  1442 mm to 1441 mm - speed 60/65 and monitor  1440 mm to 1439 mm - monitor  1430 mm to 1428 mm – monitor  1427 mm to 1426 mm – speed 60/65 and monitor  ≤1425 mm – speed 20/20 and monitor | | | | | | | | | | |  | | | |
| Check Rail Effectiveness | | | | | Mainline | |  | | | ≥1400 mm - speed 10/10 and pilot trains  1399 mm to 1398 mm - speed 40/40 and monitor  1397 mm to 1396 mm - speed 60/65 and monitor  1388 mm to 1386 mm – monitor  1385 mm to 1384 mm – speed 60/65 and monitor  1383 mm to 1382 mm – speed 40/40 and monitor  <1382 mm– speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Check Rail Flangeway Width | | | | | Mainline | |  | | | >49 mm - speed 60/65 and monitor  49 mm to 48 mm– monitor  39 mm to 38 mm – monitor  <38 mm - speed 60/65 and monitor | | | | | | | | | | |  | | | |
| Gauge  (At crossing nose) | | | | | Turnout | |  | | | ≥1443 mm - speed 20/20 and monitor  1442 mm to 1441 mm - speed 60/65 and monitor  1440 mm to 1439 mm - monitor  1430 mm to 1428 mm – monitor  1427 mm to 1426 mm – speed 60/65 and monitor  ≤1425 mm – speed 20/20 and monitor | | | | | | | | | | |  | | | |
| Check Rail Effectiveness | | | | | Turnout | |  | | | ≥1400 mm - speed 10/10 and pilot trains  1399 mm to 1398 mm - speed 40/40 and monitor  1397 mm to 1396 mm - speed 60/65 and monitor  1388 mm to 1386 mm – monitor  1385 mm to 1384 mm – speed 60/65 and monitor  1383 mm to 1382 mm – speed 40/40 and monitor  <1382 mm– speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Check Rail Flangeway Width | | | | | Turnout | |  | | | >49 mm - speed 60/65 and monitor  49 mm to 48 mm– monitor  39 mm to 38 mm – monitor  <38 mm - speed 60/65 and monitor | | | | | | | | | | |  | | | |
| Wing Rail Vertical Wear | | | | | | |  | | | 5 mm to 10 mm – monitor  >10 mm - speed 40/40 and monitor | | | | | | | | | | |  | | | |
| Crossing Nose Broken Down or Worn width  (Within transfer length) | | | | | | |  | | | 15 mm to 20 mm – monitor  21 mm to 25 mm – speed 40/40 and monitor  >25 mm – speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Ineffective Bearers/Fasteners  (In critical area) | | | | | | |  | | | 1 only – monitor  2 consecutive – speed 40/40 and monitor  >2 consecutive - speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Cracks in Cast Crossings | | | | | | |  | | | Partially cracked – Monitor  Fully cracked (not affecting running surface) – speed 60/65 and monitor  Fully cracked (affecting running surface) – speed 10/10 and pilot trains | | | | | | | | | | |  | | | |
| Spacer Blocks | | | | | | |  | | | Broken/cracked - monitor | | | | | | | | | | |  | | | |
| Check Rail Bolts  (Each Check Rail) | | | | | | |  | | | Loose – monitor  Missing/Ineffective:  ≤2 bolts –monitor except for 60/65 speed 25 tonne 40/40 speed 30 tonne axle load traffic areas  3 bolts– speed 60/65 except for 40/40 speed in 25 or 30 tonne axle load areas.  >3 bolts – speed 20/20 and monitor | | | | | | | | | | |  | | | |
| Crossing Bolts | | | | | | |  | | | Loose/Missing/Ineffective - record as defect and prioritise | | | | | | | | | | |  | | | |
| Metal Flow  (At crossing nose) | | | | | | |  | | | Report if crossing nose has metal flow | | | | | | | | | | |  | | | |
| General | | | | Ok/Not Ok | | | | Comments | | | | | | |  | | | Ok/Not Ok | | | Comments | | | |
| Response assessment by competent person | | | | | | | | | | | | | | | | | | | | | | | | |
| Drainage | | | |  | | | |  | | | | | Stock Rails (1) | | | | |  | | |  | | | |
| Bearers/Fasteners | | | |  | | | |  | | | | | Check Rails (1) | | | | |  | | |  | | | |
| Ballast | | | |  | | | |  | | | | | Other Rails (1) | | | | |  | | |  | | | |
| Track Geometry (2) | | | |  | | | |  | | | | |  | | | | |  | | |  | | | |
| Catchpoints | | | | Ok/Not Ok | | | | Comments | | | | | |  | | | | Ok/Not Ok | | | Comments | | | |
| In addition to Points and General sections above | | | | | | | | | | | | | | | | | | | | | | | | |
| Throw Off Rail | | | |  | | | |  | | | | | Derail Block | | | | | |  | |  | | | |
| BEARERS REQUIRED (Optional) | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.8m | | 3.0m | 3.2m | | | 3.4m | | | 3.6m | | 3.8m | 4.0m | | | | 4.2m | 4.4m | | | 4.6m | | 4.8m | 5.0m | 6.0m |
|  | |  |  | | |  | | |  | |  |  | | | |  |  | | |  | |  |  |  |

Notes:

1. Reporting of rolling contact fatigue (RCF), rail squats, wheel burns and corrugations which will require appropriate repair / renewal action
2. If the Track Geometry is assessed above as “Not ok” or the turnout has been determined as high risk, a manual assessment of track geometry parameters using form ETE0301F-04 Manual Recording of Gauge, Play & Superelevation in Points & Crossings is required.

\* “Monitor” means at an appropriate increased frequency compared to the current inspection

\* Responses are default actions pending appropriate repair / renewal action

\* If the cause of a defect is known, and it is known that it will not deteriorate into an unsafe condition an alternate response to that shown is permitted with appropriate documentation

Name of Inspector: Signature: