UGL REGIONAL LINX

DEFECT MANAGEMENT GUIDELINES

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CRN CM 003

LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

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Revision	Issue Date	Revision Description
1.0	11.11.2021	UGLRL Operational Standards Template applied
2.0	29.11.2021	First approved and issued UGLRL version
3.0	21.06.2023	Clarifications to defect management process based on feedback from Infrastructure Team

Summary of changes from previous version

Section	Summary of change
1.1	Clarified the purpose of this document
1.3	Deleted the section on application timeframe as it is no longer relevant
1.4	Updated references, clarified difference between mandatory and guideline defects
2.0	Responsibilities section rewritten to use RACI model and clarified to current UGLRL structure
3.0	Competency information clarified
4.0	Entire process clarified for UGLRL requirements
5.0	UGLRL systems processes updated

Chapter 1 Introduction

C1-1 Purpose

This document provides mandatory requirements, guidelines and processes for CRN staff on the management of track and civil defects identified for CRN assets.

The manual specifically covers

- Standard requirements for how defects are to be encoded in the Infor system
- The treatment of defects not resolved before the assigned removal date, also known as the revised target date (REVTAR).
- For defects types that have slow rates of growth the authority to extend the inspect / repair dates beyond the default timing set out for the response category (Infor 'rail priority').

This manual is provided to provide clarity on how this process should be undertaken and ensure uniformity across the network. .

C1-2 Context

This manual is part of the CRN engineering suite of documents.

This document does not over-ride, replace or amend any procedures contained in other CRN CM Manuals as it is intended to assist staff in the implementation of the standards and procedures described in other manuals.

This document does not provide instruction or training in the use of the Defect Management System (Infor). This document does not provide instruction or training in the use of Work Orders in Infor.

C1-4 References

C1-4.1 CRN Documents

CRN CS 100	Civil Technical Maintenance Plan
CRN CM 001	Civil Technical Competencies and Engineering Authority
CRN CM 203	Track Inspection
CRN CM 224	Rail Defects and Testing
CRN CM 302	Structures Examination
CRN CM 401	Geotechnical Risk Assessment and Hazard Management Guidelines
CRN CM 511	Boundary Fences

C1-4.2 Definitions

CRN CM 203 – Track Inspection includes the following definitions for Response Categories:

Standard defect categories and responses

All defects are categorised in one of six standard defect categories as follows:

Response Category	Inspect and verify response	Action
Emergency 1 (E1)	Prior to passage of next train	Prior to passage of next train
Emergency 1 (E1)	Non-Operational lines: Within 8 hours	Non-Operational lines: Same day

Response Category	Inspect and verify response	Action
Emergency 2 (E2)	Within 2 hours or before the next train, whichever is the greater	Within 24 hours
Emergency 2 (E2)	Non-Operational lines: Within 8 hours	Within 24 hours
Priority 1 (P1)	Within 24 hours	Within 7 days
Priority 2 (P2)	Within 7 days	Within 28 days
Priority 3 (P3)	Within 28 days	Program for repair
Priority Monitor (Pxx)	Access / Inspect next inspection	For monitoring of non categorised / undersized defects
Normal (N)	Nil	Routine inspection

The defect manual also categorizes defect types as either “Mandatory” defects or “Guideline” defects.

Chapter 2 Management requirements

CRN has in place a Defect Management System (Infor) for the recording, reporting and management of all track and civil defects. Infor uses the term “Non-Conformities” to refer to defects, but the CRN Engineering Standards will use the term Defect. The two terms should be considered interchangeable.

All defects should be entered into the Infor system in the Non-Conformity module. It is permissible for track and bridge examiners to report defects directly into Infor themselves (for example, by the Infor mobile application) or to use the Weekly Defect Summary Report (CRN CM 203 Form2) and have their Supervisor enter. In either case, Infor must be updated within 1 week of the examination taking place.

Specific management requirements for the inspection, identification, prioritisation and response to defects are detailed in the manuals referenced in section 1-4.1.

C2-1 Responsibilities Overview

The following table gives an overview of the responsibilities for various steps of the defect management process and applies a RACI (Responsible, Accountable, Consulted, Informed) classification for each step.

Process Step	Track Examiner	Supervisors	Superintendents	Civil Maintenance	Area Manager	Principal Track & Civil
Identify and record defects	R	A				
Ensure appropriate review processes for defects are in place				R/A		C

Determine & Implement Appropriate Risk Controls		R	A	C		
Prioritise defects for removal		R	A	C	I	
Identify Extended Duration Defects & Determine Risk Level			R	I	A	
Authorise REVTAR of Guideline Defects			R	A	I	I
Authorise REVTAR of Low-Risk Mandatory Defects			R	A	C	C
Authorise REVTAR of Other Mandatory Defects			C	R	C	A
Undertake surveillance inspection of Extended Duration Defects	R	A				
Update Infor with Defect Close out	R	A				

Chapter 3 Competencies

Defects shall only be identified, categorised and assigned a priority and response timeframe by, competent persons carrying out the examination, repair or review of the track or civil asset.

A list of track and civil activities that are covered by given competencies is provided in CRN CM 001.

Entry of the defect information into the Infor system may be undertaken by people who have been trained and briefed in the relevant Infor modules without requiring them to hold civil competencies from CRN CM 001.

The Civil Maintenance Engineer shall ensure that appropriate review processes are in place where non-technical staff perform data entry of Defect data.

Chapter 4 Defect Management Process

This chapter provides guidance to CRN staff in the management of defects, this guidance being provided by supporting mandatory requirements and guidelines rules to assist staff in applying the correct process.

C4-1 Mandatory Requirements and Guidelines

The following mandatory requirements (**MR#**) and guidelines (**GL#**) are to be applied in the management of defects, and as indicated in the defect management flow chart.

C4-1.1 MR1 Defect Identification

All defects must be entered into the Defect Management System (Infor) in the Infor Non-Conformity module.

C4-1.2 MR2 Defect Response Category

All defects must be assigned a defect response category in in the Defect Management System in accordance with the relevant CRN Engineering Manuals or as otherwise determined by competent personnel where no requirements exist.

C4-1.2.1 Elevating Defect Response Category

Defect response categories may be elevated from an initial assessment (i.e. P2 to P1) under the following examples

- When a review of the initial assessment determines an incorrect assignment of response category
- During a reassessment of the defect, the response category is elevated due to degrading condition
- Circumstantial factors that warrant a more urgent response, such as adjacent defects that have a compounding effect
- Culmination of multiple defects at the one location into a single defect entry

The comments register for the Infor Non-Conformity must be updated to capture any change in the defect categorisation.

C4-1.2.2 Lowering of Defect Response Category

Defect response categories for mandatory defects may only be lowered (i.e. P3 to N) in the following circumstances

- Where the initial assessment has been incorrectly assigned. A minimum of Engineering Authority EA 3 (i.e.. Maintenance Superintendent) is required to approve the lowering of the defect category.
- After work is completed that lowers the category but does not remove the defect completely. The existing defect ID must be retained. A minimum of personnel with *Track Examiner* or *Bridge Examiner* qualifications (see CRN CM 001) is required to approve the lowering after works.
- Response categories for mandatory defects must not be lowered without some form of action.

For guideline defects, a competent person may lower the response category for reasons other than the above, such as if there are mitigating circumstances or advantageous circumstantial factors.

In all cases, the comments register for the Infor Non-Conformity shall be updated to capture any change in the defect categorisation.

C4-1.3 MR3 Defect Inspect / Repair Date including Revised Target Date REVTAR)

All defects must have a nominated inspect / repair date in the Defect Management System in accordance with the relevant CRN engineering manuals, if specified. Some defect types may not have an inspection or repair date associated with them, for example, P3, Pxx, Rxx, and Mxx defect priorities.

C4-1.3.1 Initial Inspection / Repair date

The initial defect inspect / repair date shall be as per the response requirements of the applicable CRN Engineering Manual (i.e.. P2 within 28days). This initial inspect / repair removal timeframe will enable the defect to be assessed for potential for the defect to deteriorate.

Where the respective CRN Engineering Manual allows an extension of this initial response the assessed date shall be entered as the initial inspect / repair date.

C4-1.3.2 Unrepaired defects by due date

Where a defect is not removed prior to the inspect / repair date assigned in C4-1.3.1 a REVTAR is required. The defect must be re-assessed by a competent person with the appropriate level of engineering authority delegation and the inspect / repair date updated in Infor.

The REVTAR inspect / repair timeframe should be in accordance with the relevant CRN Engineering Manual.

Where the REVTAR is proposed to be extended beyond that specified in the relevant CRN engineering manuals (i.e. P2 within 28days) an additional review, assessment and provision of an action plan in accordance with C4-1.3.3.

The minimum EA level for approving is as per the table in C4-1.3.4.

In all cases, when a defect is REVTAR's for the first time, the status of the defect in Infor must be changed from NEW to REVTAR.

C4-1.3.3 Extension of Inspect / Repair timeframe

Extension of timeframe to inspect / repair may only be applied to defect types that are determined to have slow rates of growth between subsequent reassessments. The selected timeframe to inspect / repair must be based on observation and measurement, and be frequent enough to ensure at least two inspections prior to becoming an Emergency Defect.

Examples defects that may have extended timeframes may include, but not limited to

- Wide gauge on concrete sleepers
- Wide gauge due to curve wear only
- Isolated wide sleeper spacings
- Rail corrugation
- A singular missing or broken component that needs replacement and won't degrade rapidly overall (i.e. a missing bolt in a crossing). Repair defect rather than reassess as missing.
- Defects on seasonal lines
- Defects with temporary speed restrictions applied (with the exception of mandatory track defects, internal rail defects and defects other than Rxx and Mxx for structures defects)

Where the timeframe is proposed to be extended, the date must not be later than the next relevant major examination of the asset or component (e.g. detailed tie examination for sleeper defects, rail condition and wear examination or detailed walking for rail surface defects, etc). In all cases the comments register in Infor must be used to capture the details of the decision to extend the date.

Extension of inspect / repair dates beyond the *default* timeframe (i.e. P2 within 28days) must not be granted for the following defect types unless appropriately protected by a speed restriction or other appropriate method as agreed with the District Engineer.

- Mandatory track defects as per CRN CM 203
- Internal rail defects
- All structures repair or monitoring priorities except Rxx and Mxx.

In all cases above where extension of timeframes has occurred the defects must be supported by records documenting relevant assessments and stored in an appropriate records management system.

The comments register for the Infor Non-Conformity must be updated to capture the change in detail.

C4-1.3.4 GL4 Number of REVTAR reviews

While there is an intent to minimise and reduce defects, it is acknowledged that some defect types may need to be reassessed before actions can be taken to remove the defect permanently (i.e. sleeper spacing defects along an entire line, or incorrect fishplates). A guideline table has been provided below for the escalation of approval of defects to remain in track.

The number of reviews is to be applied to both scenarios where an inspect / repair date uses the default timeframe or has been extended with review. This table intends to focus on higher priority defects that are constantly reassessed, lower overall defect numbers, reduce resource wastage on reassessment and provide an action plan to address the defect.

Where the number of reviews by the person with the base level of authority appropriate for the defect type exceeds that provided in the below table, a once-off endorsement of the defect management approach shall be endorsed by a person with minimum EA Level 4 (i.e. Civil Maintenance Engineer). This endorsement must be written (may be an email) and may be for a single defect or a number of defects. The details for the management of the defect(s) shall be recorded in the region's Defect Management Plan.

CRN Manual	Response Category	Maximum Reviews before Escalation**	Minimum Authority
CM 203	E1	1	EA3
CM 203	E2	2	EA3
CM 203	P1	4	Track Certifier
CM 203	P2	6	Track Certifier
CM 302	Rm1 / Mm1	1	EA3
CM 302	Rm6 / Mm3 / Mm6	2	Bridge Examiner
CM 302	Ry1,2,4,5 / My1,2,4	2	Bridge Examiner
CM 224	Internal Rail	n/a*	Ultrasonic Tester

* response as per actions within manual

**when the no. of reviews has been reached, endorsement of defect management approach by minimum EA Level 4 is required.

C4-1.3.5 MR5 Resolving defects in the Defect Management System and records management

All completed defects are to be assigned CLOSED in the Defect Management System.

The only exception is open **P3** AK Car defects which are SUPERSEDED as detailed in chapter 5.

All defects must be assigned a Completion Date. This includes defects where no physical repair works have been undertaken but the defect no longer exists. This includes AK car defects which are SUPERSEDED and defects resolved because of disposal of an asset such as bridge renewals.

All defect-related entries in the Defect Management System must be supported by relevant records and documentation that are stored in an appropriate records management system. Examples of records may include examination forms, before and after sheets, reassessment records, track recording car files, defect listing reviews, track certification certificates and related correspondence.

C4-1.3.6 GL6 Recording of Multiple Similar Type Defects on Linear Assets

Where significant numbers of same type defects are identified on linear assets, and these multiple defects will be rectified or monitored by the same work order, they may be grouped under one defect entry. Typical examples may include but are not limited to:

- Ineffective sleeper defects grouped in up to 500m max track sections
- Sleeper spacing defects grouped in up to 500m max track sections
- Welds on sleepers grouped in up to 500m max track sections.

Additional defects found subsequently may be appended to the original entry. The work log must be updated to reflect the change in detail.

Chapter 5 Specific Defect Issues

This chapter contains specific processes and administrative treatment of defects in Infor that may not be covered on the defect management flow chart in chapter 4.

C5-1 Creating a New Defect in Infor

The following steps create a defect in Infor that has been identified during various inspections.

1. Log on to Infor and navigate to Equipment > Nonconformities > Nonconformities
2. Click on the “New Record” icon  , or hit CTRL+N.
3. Select the Equipment (asset) of which you need to raise the nonconformity for by clicking the lookup icon in the “Equipment” field.
4. Select the Nonconformity Type by clicking the lookup icon in the “Nonconformity Type” field.
5. Select an appropriate class for the nonconformity, by clicking the lookup icon in the “Class” field.
6. If the nonconformity relates to a linear-type asset, fill out the “From Point” and “To Point” fields at the bottom of the screen.
7. Click the Save icon  , then click the Observations tab
8. Click to highlight Observation 1, and if applicable, change the “Recorded By” or “Date Recorded” values. While the observation record is still selected, add any details as needed to the “Observation Note” field. Save the record.
9. If applicable, click the “Comments” tab or “Documents” tab and add any additional information about the nonconformity here.

C5-2 Welded Track Stability Analysis (WTSA) Defects

WTSA Defects are managed by the WTSA Program, and there is no requirement to enter WTSA Priority Defects as Non-Conformities in Infor. However, where there is a track defect identified through the WTSA analysis that is also a track defect (for example, WTSA analysis identifies that there is a ballast deficiency on the shoulder) the track defect should be recorded in Infor as an ordinary Non-Conformity and managed in accordance with all the normal processes.

C5-3 Temporary Speed Restrictions (TSR)

The primary source of truth for temporary speed restrictions is the TfNSW “Equip” System. All TSRs must be entered into Equip, and all updates and removals should be done through the Equip system.

TSRs are also tracked in Infor. All TSR’s applied in the CRN are treated as a type of defect in Infor, albeit linked to an underlying related defect (i.e.. a track geometry defect). TSR non-conformities should select the TSR Non-Conformity Type, and they do not have any repair date.

The following steps are used to populate additional details when creating a TSR defect. The initial defect should be created using steps provided in C5-1, with the additional requirements of:

Following on from the creation of the defect:

1. Fill in the General Attributes of the TSR from the TSR Form
2. For consistency a short description shall be included in the defect summary:

   “TSR – [short description of reason]. ID [speed restriction ID number]

   Note: all TSR defects must be assigned against the relevant Track (TR) asset in Infor.

Where a TSR has been applied, the initial defect priority must not be altered in Infor unless work has been undertaken to rectify. However, the inspect / repair date within Infor may be altered to reflect the control in place. Example: An applied TSR lowers the initial P1 defect from within 7days to P2 within 28days – Infor would still report a P1 with a 28-day timeframe and updated work log comments).

Where a TSR is applied:

- In one direction only, a single TSR defect is required, with the direction specification of “UP DIRECTION” or “DOWN DIRECTION”, whichever is applicable.
- In both directions and start/finish at the same, a single TSR defect is required, with the direction specification of “UP & DOWN DIRECTION”.
- In both directions and start/finish or have a different speed, two TSR defects are required, with the direction specification of “UP DIRECTION” & “DOWN DIRECTION” as applicable.

C5-4 Internal Rail Defects

All internal rail defects should be managed in accordance with the process outlined in CRN CM 224. Re-examinations and extensions of time for internal rail defects must be done by a competent ultrasonic examiner following a physical examination of the defect with ultrasonic testing equipment.

C5-4.1 Non-Sizable Defects (NSD)

Non-Sizable Defects (NSD) are typically found during the rail flaw detection car runs on each line. These are potentially an early indicator of a future internal rail defects and are not required to be captured in Infor. If captured in Infor, they should use a P3 priority.

C5-5 Kilometrage (KM) of Defects on Linear Assets vs Discrete Assets

Infor currently automatically inputs the default start and finish KM of the asset when selected in the system. For linear assets such as track, fencing, right of way etc the user needs to be aware to override the automatic KM values and input the specific start and end KM that the defect has been found. This can always be updated later if found to be in error.

For discrete assets such as bridges or turnouts this is not an issue.

C5-6 Track Recording (AK Car) Defects

Unlike other defect types, AK Car defects in Infor are typically independent of any workgroup bias as they are generated in bulk and automatically processed in Infor. AK car defects make up a significant portion of the Infor total defect population and require some specific defect management processes.

C5-6.1 Processing AK Car defect file (.txt report)

The following steps explain how AK car defects are automatically processed in Infor.

1. After the AK car has completed its track recording run on each section of line an email will be distributed containing many files including a report in text format.
2. Save the AK Car text report(s) (.txt extension) file to your computer.
3. Open the folder you saved the AK Car text files in a new window.
4. Open my computer in a new window.
5. In the my computer address bar type in \\UGLRLsvrbts01\AKCarFiles\FileIn then hit enter (this will open this files folder).
6. Drag and drop text files into the File In folder. Alternatively click on the link above and copy directly from email to the folder location.
7. Processing should commence automatically in Infor. The file will be moved out of the folder when processing is complete.
8. Login to Infor and check the new defects have been created and match the defects in the text file.

C5-6.2 SUPERSEDING AK Car Defects (applies to P3 only)

Due to the quantities of lower response category defects (P3) generated on the track recording car it is not always possible to associate similar defects due to the accuracy of the location system (KM) on subsequent recordings. Infor currently does not have automatic functionality to carry this out.

On subsequent track recording runs, open P3 AK Car defects may be SUPERSEDED in Infor (not CLOSED). This can only be undertaken after the subsequent recording run has been successfully completed and the defect report received. The intent is the new defect report will update / replace these existing defects with a replacement set.

SUPERSEDED defects must include a note in the comments log about when the new AK car run was completed and should have a SUPERSEDED date no earlier than the same date as the new AK car run.

Higher response category AK Car defects above P3 should typically not be SUPERSEDED with no work carried out. Related defects from the new AK Car defect report should be associated to the existing higher priority defects.

C5-6.3 Closing AK defects with ‘No Non-Conformity Found’

Occasionally defects reported from the AK Car contain spurious values or have unreliable location issues. The use of the terms ‘no defect found’ or similar as an only explanation for closing a defect is not an acceptable practice.

The Infor non conformity comment register must be used to capture how the determination was made that the defect did not exist which may include references to physical inspections being undertaken, desktop assessment of the AK charts and other evidence.

C5-6.4 Assessment of AK Car Defects and updating Infor

Assessment of AK car defects is defined in the CRN engineering manuals. This section provides guidelines for the management of the defect within Infor through typical example.

Example: The AK Car detects a E1 defect which requires an immediate response. The defect is assessed on site and determined to be a P1. A TSR is imposed to provide an extended response time equivalent of a P3.

Within Infor the automatic processing of the defect file as detailed in section 5-6.1 will initially create a E1 defect. After the initial field assessment is complete the Infor defect can be lowered to a P1 with the inspect / repair date and work log updated to reflect the change. This step does not require a EA Level 3 to approve the change as this is still considered to be part of the initial assessment phase.

Once the TSR is imposed, the Infor defect priority remains the same P1, the inspect / repair date may be modified to a suitable timeframe P3 associated with the control in place. At the same time, a related TSR defect would be created as per section 5-3.