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Computer Aided REhabilitation of Sewer networks

Decision Support Tools for Sustainable Water Network Management

WP1 - Construction of a control panel of performance indicators for rehabilitation

Predictable Performance Indicators

Maria Adriana Cardoso
Research Assistant
National Civil Engineering Laboratory (LNEC)

Rafaela Matos
Principal Research Officer
National Civil Engineering Laboratory (LNEC)

Lisbon, April 2005

INTRODUCTION

Following the initial presentation on Task 1.3 by LNEC, at Barcelona meeting, and the discussion that followed including WP2, WP3, WP6 and WP7, a list of predictable PIs is presented below including concept, processing rule, variables and how they are generated.

TASK 1.3 – PREDICTABLE PERFORMANCE INDICATORS

Objectives: Identification of predictable PIs, based on the results of field-testing and interface with other relevant Working Packages, namely receiving inputs from WP2 and WP3. These predictable PIs are to be used by WP6 and WP7.

Environmental indicators (sEn)

sEn1 – OVERFLOW DISCHARGE FREQUENCY (Nº/ overflow device/ year)	
Concept:	(Number of overflow discharges that occurred during the assessment period x 365 / assessment period) / number of overflow devices at the reference date
Processing rule:	$sEn1 = (sA2 \times 365 / sH1) / sC50$
Variables:	sA2 – Number of overflow discharges (Nº). sH1 – Assessment period (days). sC50 – Overflow devices (Nº).
Comments:	Predicted using long term simulations (input from WP3).

sEn2 – OVERFLOW DISCHARGE VOLUME (m³/ overflow device/ year)	
Concept:	(Total of overflow discharges that occurred during the assessment period x 365 / assessment period) / number of overflow devices at the reference date
Processing rule:	$sEn2 = (sA3 \times 365 / sH1) / sC50$
Variables:	sA3 – Volume of overflow discharges (m ³). sH1 – Assessment period (days). sC50 – Overflow devices (Nº).
Comments:	Predicted using long term simulations (input from WP3).

sEn3 – DURATION OF OVERFLOW DISCHARGE (hours/ overflow device/ year)	
Concept:	(Duration of overflow discharges that occurred during the assessment period x 365 / assessment period) / number of overflow devices at the reference date
Processing rule:	$sEn3 = (sA4 \times 365 / sH1) / sC50$
Variables:	sA4 – Duration of overflow discharges (hours). sH1 – Assessment period (days). sC50 – Overflow devices (N°).
Comments:	Predicted using long term simulations (input from WP3).

sEn4 – OVERFLOW DISCHARGE RELATED TO RAINFALL (%/ year)	
Concept:	Total volume of overflow discharges that occurred during the assessment period / rainfall volume during the assessment period
Processing rule:	$sEn4 = (sA3 / sA5) \times 100$
Variables:	sA3 – Volume of overflow discharges (m ³). sA5 – Rainfall volume (m ³).
Comments:	Predicted using long term simulations (input from WP3).

Physical indicators (sPh)

sPh1 – SURCHARGING IN GRAVITY SEWERS IN DRY WEATHER (%)	
Concept:	Length of gravity sewer where surcharging has occurred in dry weather during the assessment period/ total sewer length at the reference date x 100
Processing rule:	$sPh1 = (sC47 \times 10^{-3} / sC3) \times 100$
Variables:	sC47 – Surcharged sewers in dry weather (m). sC3 – Total sewer length (km).
Comments:	Predicted using simulation based on synthetic events (input from WP3).

sPh2 – SURCHARGING IN GRAVITY SEWERS IN WET WEATHER (%)	
Concept:	Length of gravity sewer where surcharging has occurred in wet weather during the assessment period/ total sewer length at the reference date x 100
Processing rule:	$sPh1 = (sC48 \times 10^{-3} / sC3) \times 100$
Variables:	sC48 – Surcharged sewers in wet weather (m). sC3 – Total sewer length (km).
Comments:	Predicted using simulation based on synthetic events (input from WP3).

sPh3 – HIGH SEWER SURCHARGING (%)	
Concept:	Length of sewer where a high degree of surcharging has occurred in wet weather during the assessment period/ total sewer length at the reference date x 100
Processing rule:	$sPh1 = (sC49 \times 10^{-3} / sC3) \times 100$
Variables:	sC49 – Highly surcharged sewers (m). sC3 – Total sewer length (km).
Comments:	Predicted using simulation based on synthetic events (input from WP3).

Operational indicators (sOp)

sOp9 – INFILTRATION (m³/ km / year)	
Concept:	(Volume of water entering sewers from groundwater during the assessment period x 365/ assessment period)/ total sewer length at the reference date.
Processing rule:	$sOp8 = (sD9 \times 365 / sH1) / sC3$
Variables:	sD9 – Infiltration volume (m ³). sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using infiltration model (input from WP2).

sOp10 – EXFILTRATION (m³/ km / year)	
Concept:	(Volume of water leaking from sewers during the assessment period x 365/ assessment period)/ total sewer length at the reference date.
Processing rule:	$sOp10 = (sD10 \times 365 / sH1) / sC3$
Variables:	sD10 – Exfiltration volume (m ³). sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using exfiltration model (input from WP2).

sOp11 – SEWER BLOCKAGES (Nº/ 100 km / year)	
Concept:	(Number of blockages in sewers that occurred during the assessment period x 365/ assessment period)/ total sewer length at reference date x 100
Processing rule:	$sOp11 = (sD11 \times 365 / sH1) / sC3 \times 100$
Variables:	sD11 – Sewer blockages (Nº). sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using blockage model with a probability/frequency value associated (input from WP2).

sOp15a – FLOODING FROM SANITARY SEWERS (Nº/ 100 km sewer / year)	
Concept:	(Number of flooding incidents related to sanitary sewers during the assessment period x 365/ assessment period)/ total sewer length at the reference date x 100
Processing rule:	$sOp15a = (sD15a \times 365 / sH1) / sC3 \times 100$
Variables:	sD15a – Flooding from sanitary sewers (Nº) sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using long term simulations (input from WP3).

sOp15b – FLOODING FROM COMBINED SEWERS (Nº/ 100 km sewer / year)	
Concept:	(Number of flooding incidents related to combined sewers during the assessment period x 365/ assessment period)/ total sewer length at the reference date x 100
Processing rule:	$sOp15b = (sD15b \times 365 / sH1) / sC3 \times 100$
Variables:	sD15b – Flooding from combined sewers (Nº) sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using long term simulations (input from WP3).

sOp19 – SEWER COLLAPSES (Nº/ 100 km sewer / year)	
Concept:	(Number of sewer collapses during the assessment period x 365/ assessment period)/ total sewer length at the reference date x 100
Processing rule:	$sOp19 = (sD19 \times 365 / sH1) / sC3 \times 100$
Variables:	sD19 – Sewer collapses (Nº) sH1 – Assessment period (days). sC3 – Total sewer length (km).
Comments:	Predicted using structural model (input from WP2).