ARCADIS | Design & Consultancy for natural and built assets

CONDITION MANAGEMENT NEN 2767 AND MULTI-YEAR MAINTENANCE PLANNING

PIXII - ATIC

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5 years Branch manager at Imtech Maintenance and 10 years Maintenance manager at Air & Chaleur (now Spie).

Sectors: Industry, residential-, office buildings, retail, warehouse and dataroom.

At Arcadis > Condition measurements NEN 2767 and maintenance checks techniques.

Audit techniques, preparation of maintenance schedules (MJOP).

Audit techniques ifo TDD (Technische Due Dilligence) for buyer or vendor

Proximus, Douwe Egberts, Arcelor Mittal, Mazda Europe, IBM

Agenda
Condition measurements NEN 2767 - MYMP

NEN 2767

Application and guidance client

Process inventory

Tour on site

Report MYMP

Questions

NEN 2767

Source NEN 2767:

- Condition measurements of buildings specialised in Dutch housing companies and government buildings

- DC-MOP® => condition measurements buildings

Condition measurements according to NEN 2767

- TEMAX® => maintenance and condition of technical installations

Measurement according to NEN 2767

- Software NEN 2767 – MJOP

PLANDATIS – O Prognose

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Slide 1

Methodology

Maintenance measurement technical installations

MJOP PLANDATIS ®

Technical installations

- HVAC
- Electricity
- Plumbing
- Safety equipment
- Mechanical equipment

Evaluation effect

- Health & Safety
- Utilisation & businessprocess
- Functionality & Costs
- Increase of maintenance complaints
- Esthetics & technique
- Energy

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Slide 2

Priority matrix

Risico/prioriteit	9	8	7	6	5	4	3	2	1
Veiligheid & Gezondheid							geel	oranje	rood
Gebruik en bedrijfsproces							geel	oranje	rood
Functionaliteit & Kosten						geel	oranje	rood	
Toename klachtenonderhoud					geel	oranje	rood		
Esthetica & Techniek				geel	oranje	rood			
Energie							geel	oranje	rood

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Titel: MJOP - NEN 2767 - CEDUBO

Datum: 19 december 2016

Condition Wish - Demand

Conditiemeting

Conditie Eis: 2 - Goed

	Risico / Prioriteit	9	8	7	6	5	4	3	2	1	-
a1	Veiligheid & Gezondheid							1	2	3	3
a2	Cultuur historische waarde										0
a3	Gebruik en bedrijfsproces							1	2	3	3
a4	Functionaliteit & Kosten						1	2	3		4
a5	Toename klachtenonderhoud					1	2	3			5
a6	Esthetica & Techniek				1	2	3				6
a7	Energie							1	2	3	3

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14 juni 2017   7

Condition score per element

Conditiemeting

Ernst	Intensiteit	Omvang		Conditie
3	3	5	/ 0 %	4

Bevindingen

NHG	
Bouwlaag	
Actie	Aanbrengen
Urgentie	Op korte termijn
Kostenverdeling	100,0 %

Risico-/prioriteitenmatrix

	0	1	2	3
Veiligheid Gezondheid				
Gebruik en bedrijfsproces				
Functionaliteit Kosten				
Toename klachtenonderhoud				
Esthetica Techniek				
Energie				

ℹ **Risico/prioriteit**
Het effect van het niet uitvoeren van gebreken wordt uitgedrukt in een driepuntschaal.

0 = geen effect
1 = gering effect
2 = matig effect
3 = ernstig effect

Risico/prioriteiten zijn objectieve argumenten waarmee het belang van onderhoudsactiviteiten uitgedrukt wordt.

Voorbeelden hiervan zijn:
1) Veiligheid en Gezondheid voor de gebruikers (VG). Uitstel van dit soort activiteiten leidt of kan leiden tot gevaarlijke situaties voor de gebruikers.
2) Functionaliteit en kostenconsequenties (FK). Uitstel leidt tot verlies van functionaliteit en of toename van vervolgschades.
3) Esthetica en techniek (ET). Uitstel leidt tot een gedateerd aanzien.

Het onderlinge belang is via weegfactoren bepaald (zie scenario's in ObjectInfo).

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Example Element

Element	
1. Element	
BOEI - Brandveiligheid	
BOEI - Duurzaamheid	
BOEI - Energie	
BOEI - Inzicht wet en re	
Conditie wens/eis	2
CVO - Conditiescore	4
Eenheid	st
Element	Sanitair closetpot
Element - Vervangingsv	€ 0
Hoeveelheid	1,00
Levensduur	0
Locatie	11S1
Omschrijving	
2. Coderingen	
Alertcode (Centric)	
Boocode	
Gebrekenlijst (NEN 276	C18 Sanitaire...
Materiaalcode	
NL/SfB	741110
Sorteercode	
Tag	
Vrije Code 1	160
3. Annotaties	
Bouwjaar	
Capaciteit	
Fabricaat	
Garantie	- -
Koelmiddel	

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Example Element

Handelingen | Uittrekstaat | Historie

Handeling	Gebrek	Norm	Hierarchie	Hoeveelheid	Ehd	Normbedrag	Startjaar	Cyclus	Fo...	Totaal
Ontgrendelen van hoekkraan	Corrosie kraan		Onderh... 100	1,00	pst	€ 30,00	2017	15	10	€ 30
Ontgrendelen van hoekkraan	Corrosie kraan		Onderh... 100	5,00	pst	€ 30,00	2017	15	10	€ 150
Vervangen sanitair closetpot, staand	Geen gebreken		101	6,00	st	€ 740,00	2064	48	20	€ 4.440
Vervangen sanitair closetpot, vrijhangend met inbouwreservoir	Geen gebreken		101	2,00	st	€ 1.280,00	2064	48	20	€ 2.560

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Methodology

Procedure

1) Qualifications of defects : Recording and checking of defects

a) Pre-defined: **Severity** of defect

- Slight defects (score = 1)
- Serious defects (score = 2)
- Major defects (score = 3)

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b) **Intensity** of defect
    Initial stage (score = 1)
        Barely noticeable (surface corrosion)
    Advanced stage (score = 2)
        Clearly noticeable (ongoing corrosion)
    Final stage (score = 3)
        Explicitly noticeable (flaking corrosion)
c) **Extent** of defect
    Percentage of the total amount

Incidental	< 2%	(score 1)
Locally	2-10%	(score 2)
Frequent	10-30%	(score 3)
Significant	30-60%	(score 4)
General	> 60%	(score 5)

Methodology

Procedure

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Methodology

Procedure

2) Condition scores

Combination severity, intensity and extent makes Condition score

Condition score

1 = excellent condition: no or very limited deterioration

2 = good condition: early stage of deterioration

3 = reasonable condition: initiation of deterioration process

4 = average condition: progressed deterioration, incidental danger

5 = bad condition: deterioration is irreversible

6 = very bad condition: maximal deterioration

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Condition matrix

3 - Ernstige gebreken

Intensiteit / Omvang	1-Incidenteel (< 2 %)	2-Plaatselijk (2-10 %)	3-Regelmatig (10-30%)	4-Aanzienlijk (30-60%)	5-Algemeen (> 60 %)
1 - Beginstadium	1	1	2	3	4
2 - Gevorderd stadium	1	2	3	4	5
3 - Eindstadium	2	3	4	5	6

2 - Serieuze gebreken

Intensiteit / Omvang	1-Incidenteel (< 2 %)	2-Plaatselijk (2-10 %)	3-Regelmatig (10-30%)	4-Aanzienlijk (30-60%)	5-Algemeen (> 60 %)
1 - Beginstadium	1	1	1	2	3
2 - Gevorderd stadium	1	1	2	3	4
3 - Eindstadium	1	2	3	4	5

1 - Geringe gebreken

Intensiteit / Omvang	1-Incidenteel (< 2 %)	2-Plaatselijk (2-10 %)	3-Regelmatig (10-30%)	4-Aanzienlijk (30-60%)	5-Algemeen (> 60 %)
1 - Beginstadium	1	1	1	1	2
2 - Gevorderd stadium	1	1	1	2	3
3 - Eindstadium	1	1	2	3	4

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Methodology

Effect Professional Monitoring Technical Maintenance

Gemiddelde Kwaliteit Installaties

$\overline{Q}_{na}$
$\overline{Q}_{voor}$

BB_{na}
BB_{voor}

tijd

VOOR

NA
Optimalisering
Onderhoud Installaties
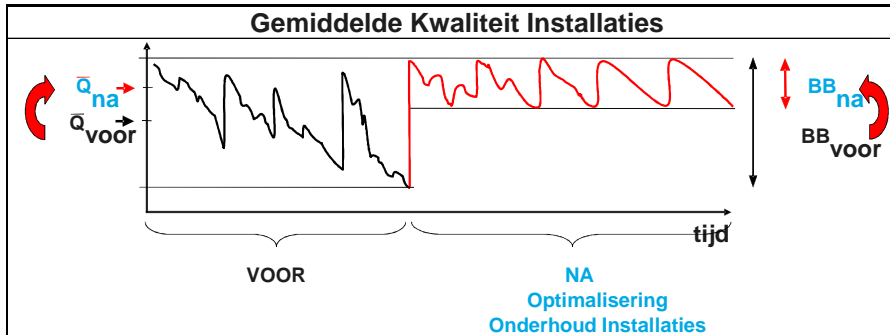
→ Improved preventive maintenance
→ Less curative maintenance
→ Higher cost efficiency: maintenance, energy

Application & guidance client

Use of the report

➢ Condition of the property and investment schedule for the upcoming period 5 j, 10 j, 20 j.

➢ Condition of the operational reliability of the technical installation.

➢ Drawing up a budget for facility related purposes.

➢ Site approach cost efficiency management short and long term.

➢ Outsourcing of the maintenance part to a third party. Non core business. Building, techniques, infra a.o.

➢ Multi-Year Maintenance Plan (MYMP/MJOP) for 5 to 10 years schedule.

MJOP Approach

Application & guidance client

Appointment for the policy of the Multi-Year Maintenance Plan (MYMP), Multi-year maintenance needs, Multi-year budget.

Availability dataroom client.

Request for use of MYMP

With the MYMP a baseline measurement and a maintenance check can also be performed.

Possibility for merging reports.

Prior agreements are of major importance, most common for the preparation of an offer.

MJOP Approach

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Inventarisation process

Most important part of the MYMP preparation.

Splitting casco part from techniques.

Determine detail of inventory.

Use of existing inventory.

Existing Excel files can be imported into software packages.

Is a part of the process in which previous made agreements are important and where modifications are difficult to implement afterwards.

When an inventory needs to be made, this will determine the largest part of the budget.

MJOP Approach

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Tour on site

The tour on site is in function of controlling the legal certificates, 5 annual inspection reports of electricity, combustion reports, RA, Inspection of elevators a.o.

Guidance by the administrator or the person with the necaissairy knowledge, for exemple operating the installation parts, ventilation group, a.o. Supervisors are also aware of de locations of central heating rooms, substations a.o.

If the tour on site is done without guidance, it might be done based on floor plans, which will also be used to indicate important remarques.

Taking sufficiant pictures. It is also very important to report remarques during the tour on site.

Entering high and low tension rooms is only allowed by BA5 persons.

MJOP Approach

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Report MJOP

Preparation by using customized software > in the current market situation, the most complete software is located at our northern neighbours.

All items are connected with NL FSB codes, budget determination and annually updated.

The NL Sfb codes for Belgium can be found in BB/Sfb, see following.

Dit SfB systeem is een **coderingssysteem, specifiek voor de bouwsector**, dat zich leent tot enorm veel toepassingen, en ook **uitermate geschikt om de bouwelementen in Revit te ordenen** … Zie de complete SfB-documentatie voor meer info , ook **BB/SfB-plus. Een functionele hiërarchie voor gebouwelementen** , door Frank De Troyer. Publicatie van 15 sept. 2008 ISBN 9789033471063, te bestellen bij Standaard Boekhandel (28€) of via de NAV-webshop (à 19.81€ voor NAV-leden) Dit boek is een uitbreiding van de publicatie: *BB/SfB Tabellen 1990 – klasseersysteem voor de bouwsector* (nog te bestellen bij de Regie der Gebouwen).

Document drafted according the approved norm NEN 2767

MJOP Approach

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Report MYMP

2 possibilities for input of data.
- Via PC (office job)
- Via Tablet (fieldwork) – time-saving

Report available with maintenance needs, planning and investments.
Adjustable according to the needs of the client.

This gives an idea on certain replacements, mostly Ad-Hoc
MYMP > clarity about budget & planning
Seperate overview of building- and installation parts
Picture report of the observations

The installations are made at a certain level in approval with the client.

MJOP Approach

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Report MYMP

Format to be delivered, PDF, overview of budgets, planning in Excel file.

2016 05 26 - BUDGET.xlsx

Import export lijst MJOP.xlsx

Voorbeeld Exel planning.xlsx

Test 2016 01.pdf

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Report MJOP

Good overview of each persons tasks within the organisation

Overview of the costs 5 – 10 – 15 year

Possibility to integrate legal determinations

Possibility to spread certain costs, flexible period.

Inventory and planning can be used i.f.o. prestation contract.

Maintenance check to be carried out by a third party at an in advanced determined KPI

MJOP Approach

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