

New maintenance strategy

Including distress analysis method and recent sensors



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Content

- › Introduction
- › Objective outsourced assessment of the pavement
- › Tools
- › Introducing the financial aspect (3D policy)
- › Alternative strategies

Introduction - Vectra

- › 1. Equipment and devices construction
 - Under IFSTTAR (LCPC) license





Introduction - Vectra

› 2. Road and runway engineering

› From preliminary studies to management of the road system, and acceptance of the works:

- Definition of short- and long-term maintenance investment strategies,
- Design of pavements,
- Maintenance, reinforcement and rehabilitation or compilation of pavements standardization,
- Assistance to road management (measurements of all required data, interpretation and analysis, definition of indicators and of thresholds for a management system),
- Analysis of short- and long-term maintenance solutions
- Site inspection (in situ control)
- Acceptance of works or of initial conditions





Introduction - Major trends

Due to budget restrictions, and its experience Vectra sees the emergence of 3 major trends :

- › Re-think maintenance policy
- › Abandon the « all thick bituminous mixture » for main networks
- › Schedule works differently

Only the 1st and 3rd items will be developed here

RE-THINK MAINTENANCE POLICY

| 1



Re-think Maintenance policy

- In period of relative abundance, you can choose the works with a technical-politic approach,
- In case of budget restriction, you need an objective, outsourced assessment of the network



Re-think Maintenance policy

- › Road database (including works done)
 - Are often misused
 - Should be « live » and updated
 - Often managed by « GIS-people » – not competent in pavement management.
 - Don't allow to forecast the network evolution
- › Necessity to focused on item who costs
 - 1 pavement 2 bridges 3 road equipment...
 - Nonsense to focus on accuracy of trees ϕ and position before !

Re-think Maintenance policy

› Choose adapted works and control it :

- How to study network evolution with such a pavement 18 months after the works were done ?

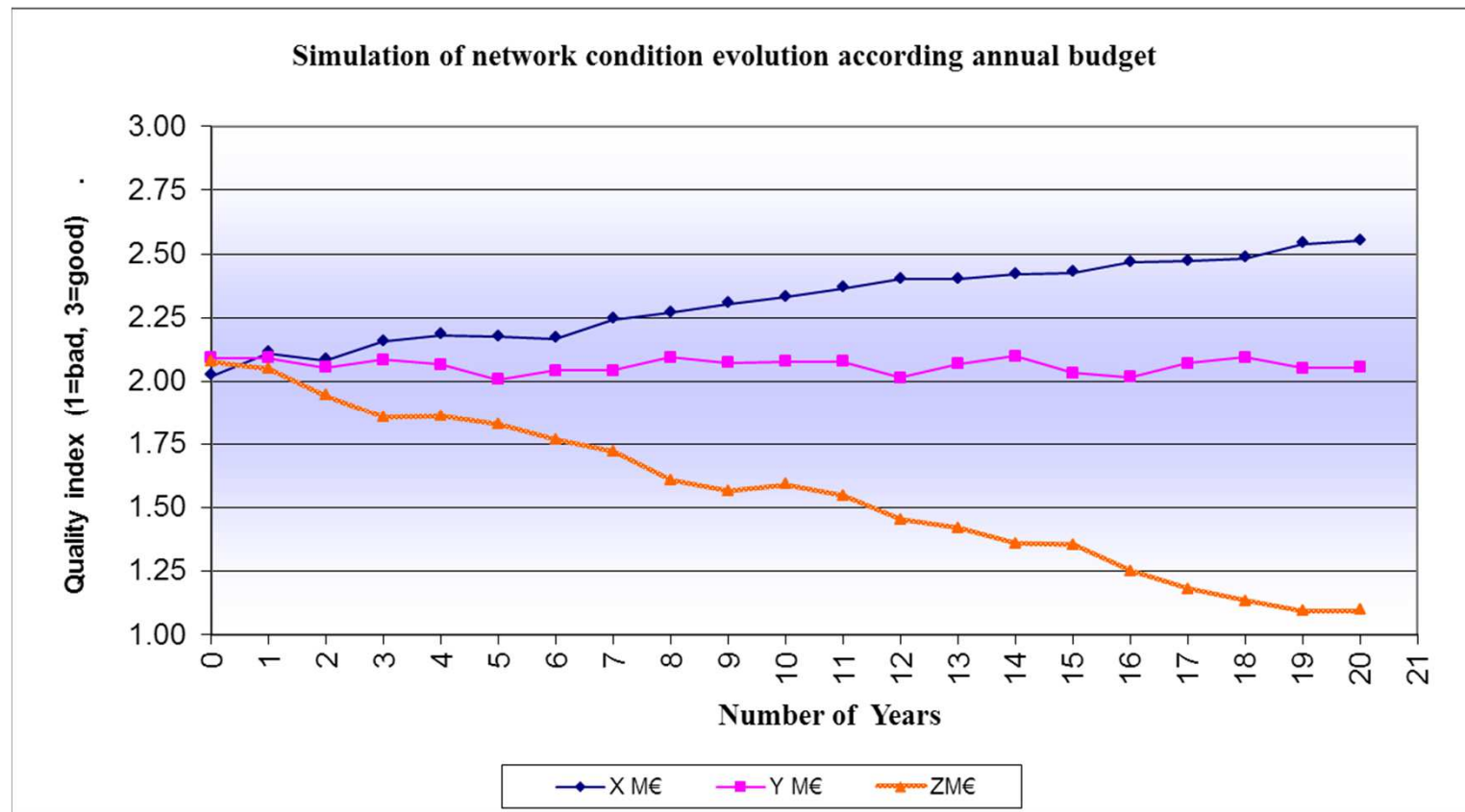


Need to study the network evolution

Quality index of a whole road network according to Annual budget forecast

1 is bad

3 is good





Need to study the network evolution

- › But to do that, you have to know
 - Type and age of the wearing courses at least
 - Type and age of the pavement layer if possible

- And it is often not available with reliability or completeness

TOOLS | 2

Distress assessment

Classical (and old) Method

Distresses	M3 method (ME 38-2)
Stripping (aggregate, binder) / peeling	Fretting , Surface stripping
	Peeling, deep stripping
Fattening up / bleeding	Local
	General
Repair with bituminous mixture	Small width < 1/2 lane
	Big width > 1/2 lane
Other repair	Small width < 1/2 lane
	Big width > 1/2 lane
Block crack	Significant
	Serious
Others cracks	Significant
	Serious
Transverse cracks	repaired
	Significant
	Serious

Vectra's Method

Distresses	M3+ VECTRA method	M2+ VECTRA method
Stripping (aggregate, binder) / peeling	Local	Local
	General	General
Fattening up / bleeding	Local	Local
	General	General
Repair with bituminous Mixture or patching	Small width < 1/2 lane	Small width < 1/2 lane
	Big width > 1/2 lane	Big width > 1/2 lane
Longitudinal cracks	Repaired	Repaired
	Franck, Clear	Franck, Clear
	Branched out or ruined	Branched out or ruined
		In wheel path
Transverse cracks	Repaired (bridged)	Repaired (bridged)
	Franck, Clear	Franck, Clear
	Branched out or ruined	Branched out or ruined
Crazing (fine or block)	Out or in Wheel path	Out wheel path
		In wheel path
Potholes	Yes	Yes



Distress assessment

- › Mains advantages of Vectra's method :
 - Only one method for all the roads (instead of 3)
 - Better repeatability and reproducibility
 - Less errors – less interpretation from operator
 - Suitable for all types of pavement (except rigid)
 - Using the same reference (ME 52) Catalog of pavement distresses

Deformation assessment

Deformation	M3 Method (LCPC 38-2)
Rutting and edge collapse	Significant (5-15 mm) Serious (>15 mm)
Method	Manually recorded



Deformation	Vectra's Method
Left Rutting	0 -15 mm
Left Rutting	15 - 30 mm
Left Rutting	> 30 mm
Right Rutting	idem
Edge collapse	0-25 mm
Edge collapse	25-50 mm
Edge collapse	> 50 mm
Method	Automatically recorded with high accuracy
	Threshold can be adjusted

Deformation assessment

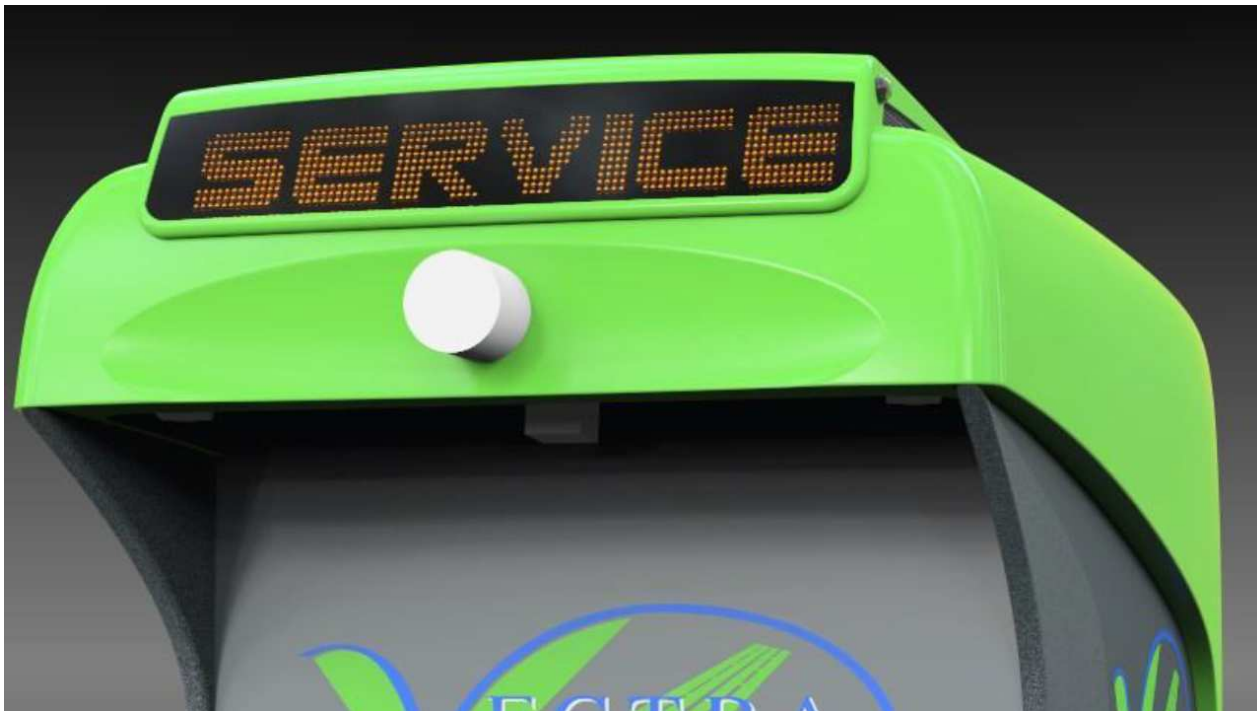
1280 points on 4 m in width without
exceed van size
Vertical resolution of 1 mm

Every 10 m, 5 m or 1 m if necessary
(lower speed)



Distress or deformation assessment 2015

New device (*AMAC 2 at this moment*)

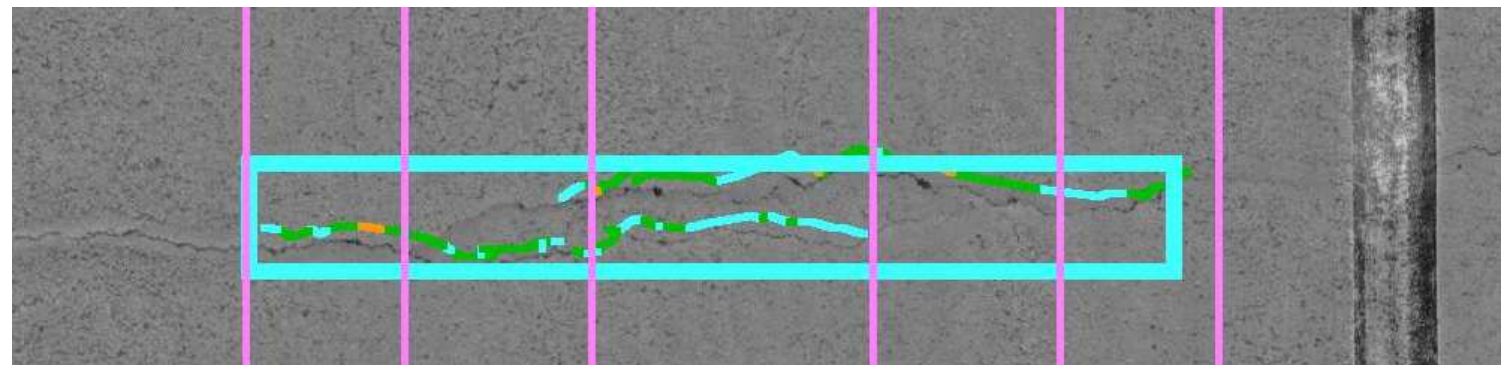
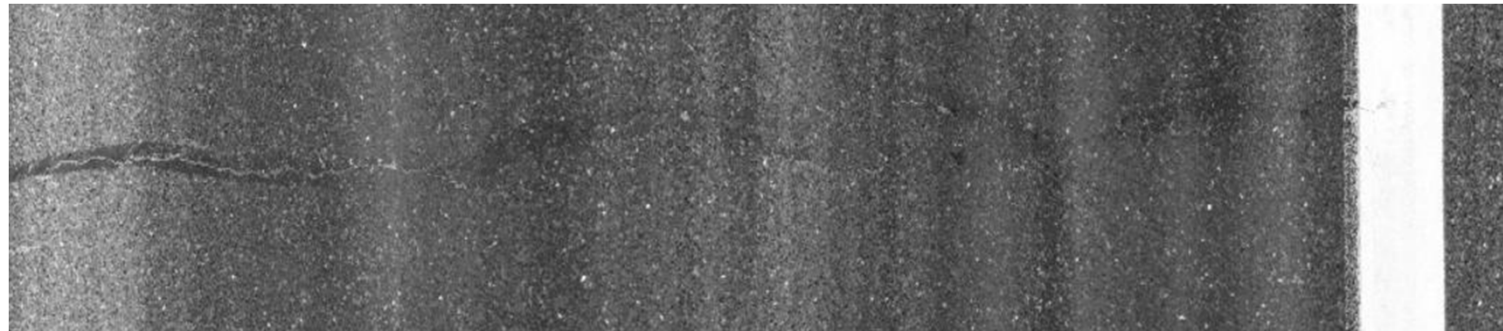


Distress or deformation assessment 2015

Cross-test between AMAC[®] and LCMS (automatic distress)

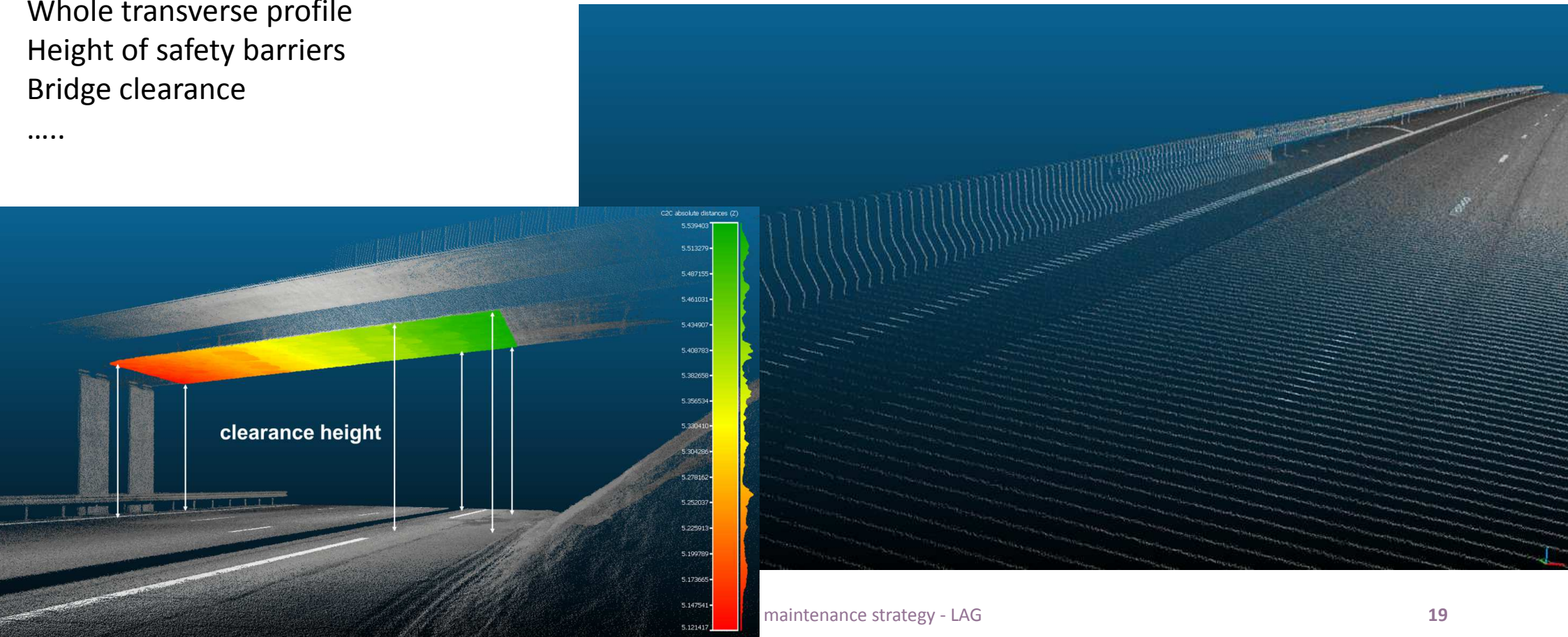
Example

*Lot of tests
done*



And more with LIDAR 350

Whole transverse profile
Height of safety barriers
Bridge clearance
.....



INTRODUCING THE FINANCIAL
ASPECT (3D POLICY) | 3

Maintenance of roads costs a lot – *when not done* !

› Maintenance / cost of money

If in 2014 crack sealing are not done for **1€/m²**

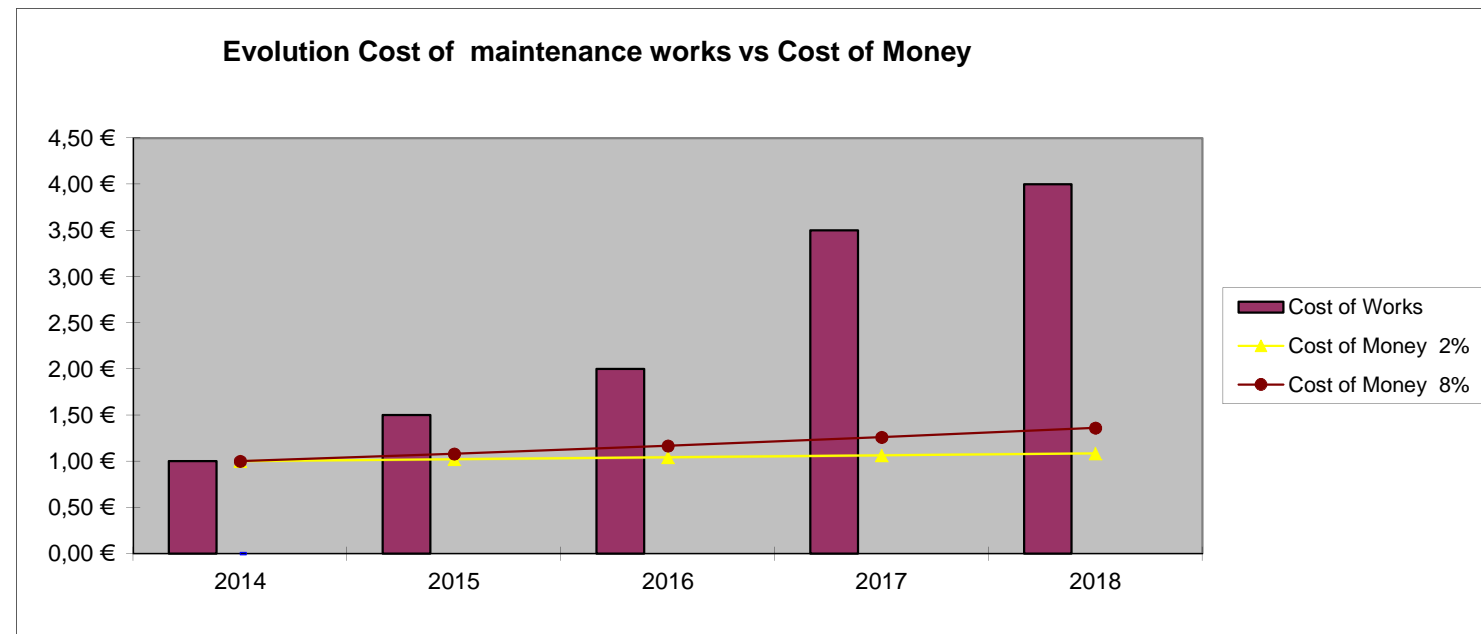
In 2015 crack sealing for 1.5 €/m²

Or in 2016 for 2 €/m²

Except that in 2017 and **2018** potholes repair for **3.5 to 4 €/m²**

And **1 €** loaned at 2 % will cost **1.082 € in 2018**

Or 1.36 € at 8 % in 2018 ...



Maintenance of roads cost a lot – when not done !

If in 2014 surface dressing SD is not done for **4 €/m²**

In 2017 reprofiling + SD for **6 €/m²**

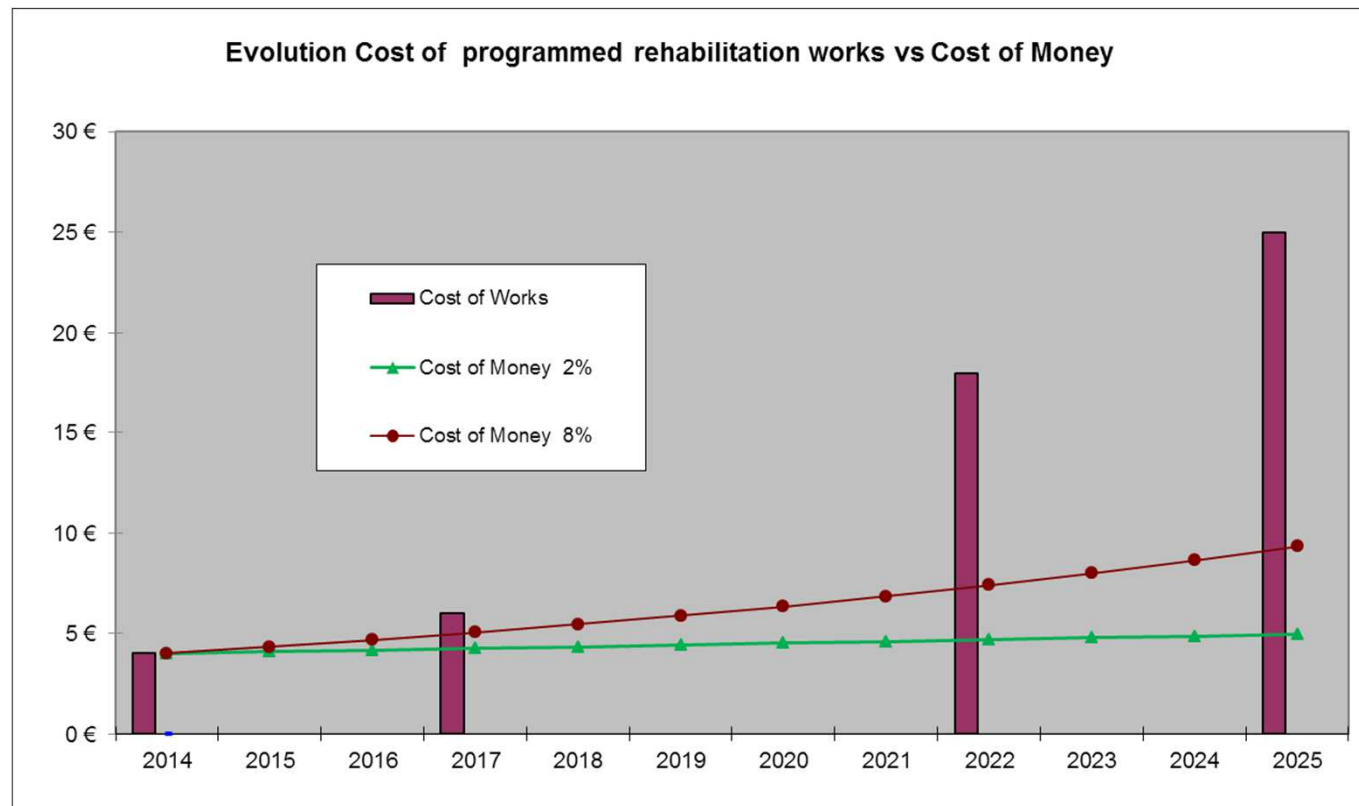
If not in 2022 replacement of failed areas + bituminous mixture **18 €/m²**

If not in 2025 more repair for **25 €/m²**

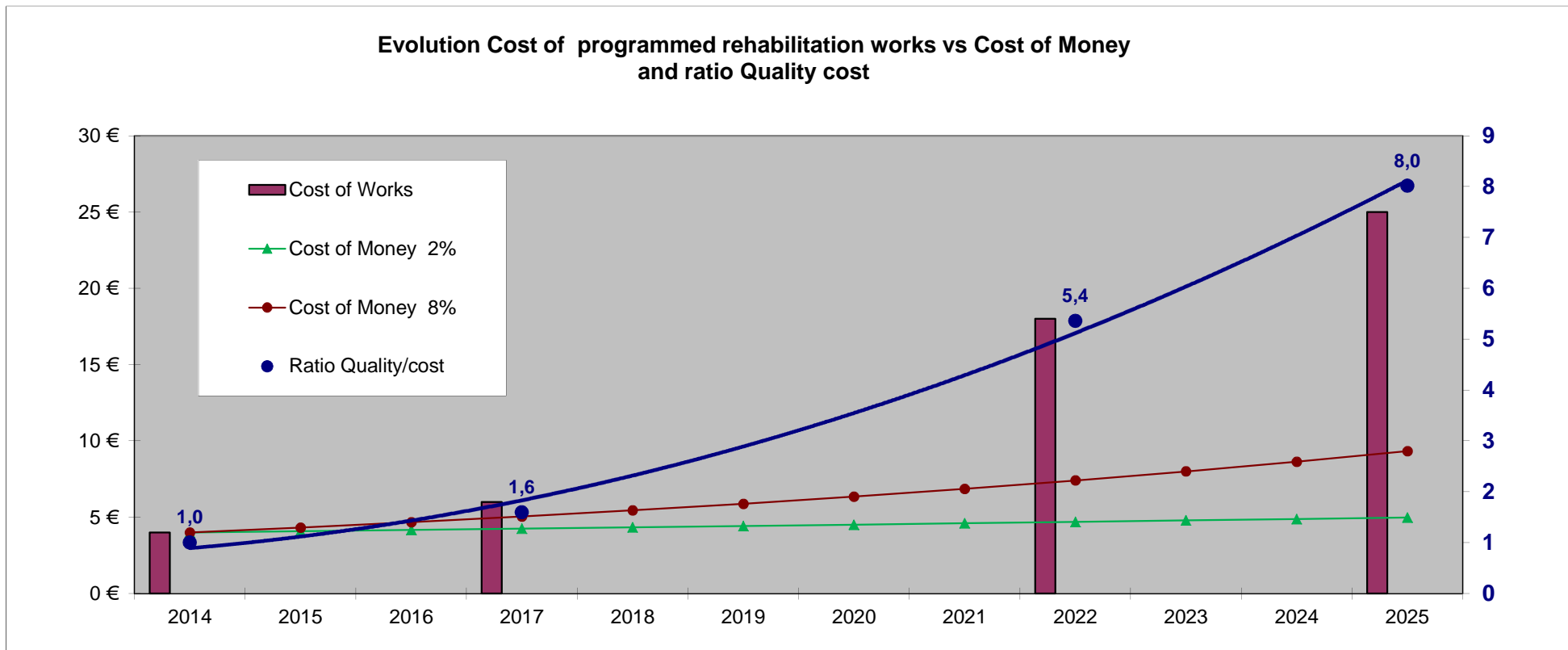
And 4 € loaned at 2 % will cost

- 4.425 € in 2017
- 4.687 € in 2022
- 4 973 € in 2025

At 8 % : 4 € in 2014 cost 9.327 € in 2025



Maintenance of roads cost a lot – when not done !





Maintenance of roads cost a lot – when not done !

In times of low interest rates, postponing some maintenance costs more, in a ratio of 2 to 3, than borrowing to carry out this work at the right time.

Advocating loans is perhaps not politically correct in the current economic climate, but in this case, it could potentially be a true act of good management and generate significant savings !

3D Policy

- **Scenario 1**

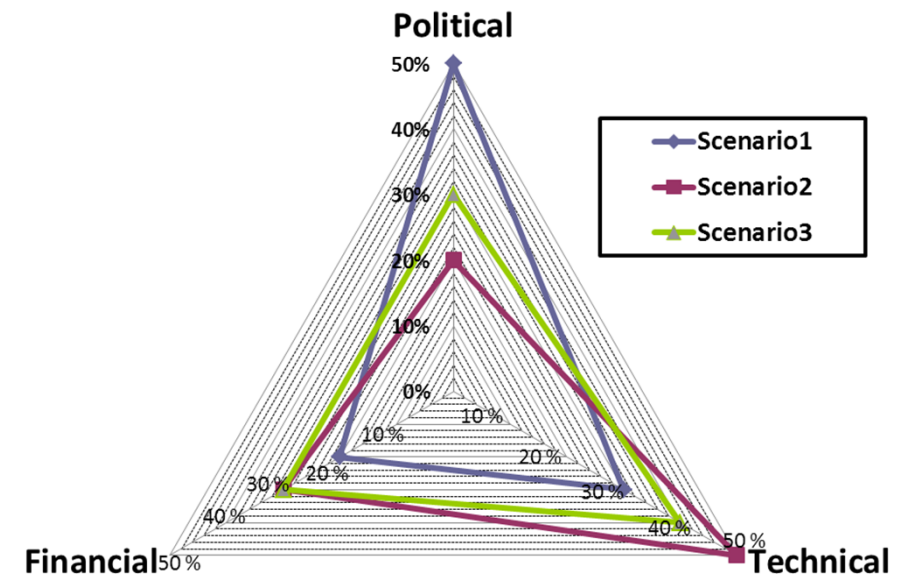
*Agree not to maintain the wearing course of a given road in order to allocate resources to other priorities.
(accept stripping, potholes)*

- **Scenario 2**

*Agree not to maintain the structural capacity of one section, in order to prioritize others.
(Concentrate on wearing courses, and not too bad sections)*

- **Scenario 3**

Taking into account the financial costs



ALTERNATIVE STRATEGIES | 4

Example of alternative maintenance strategy

Classical

Sections in bad conditions first,
Mostly with structural distresses

Rehabilitation works with ~ high cost

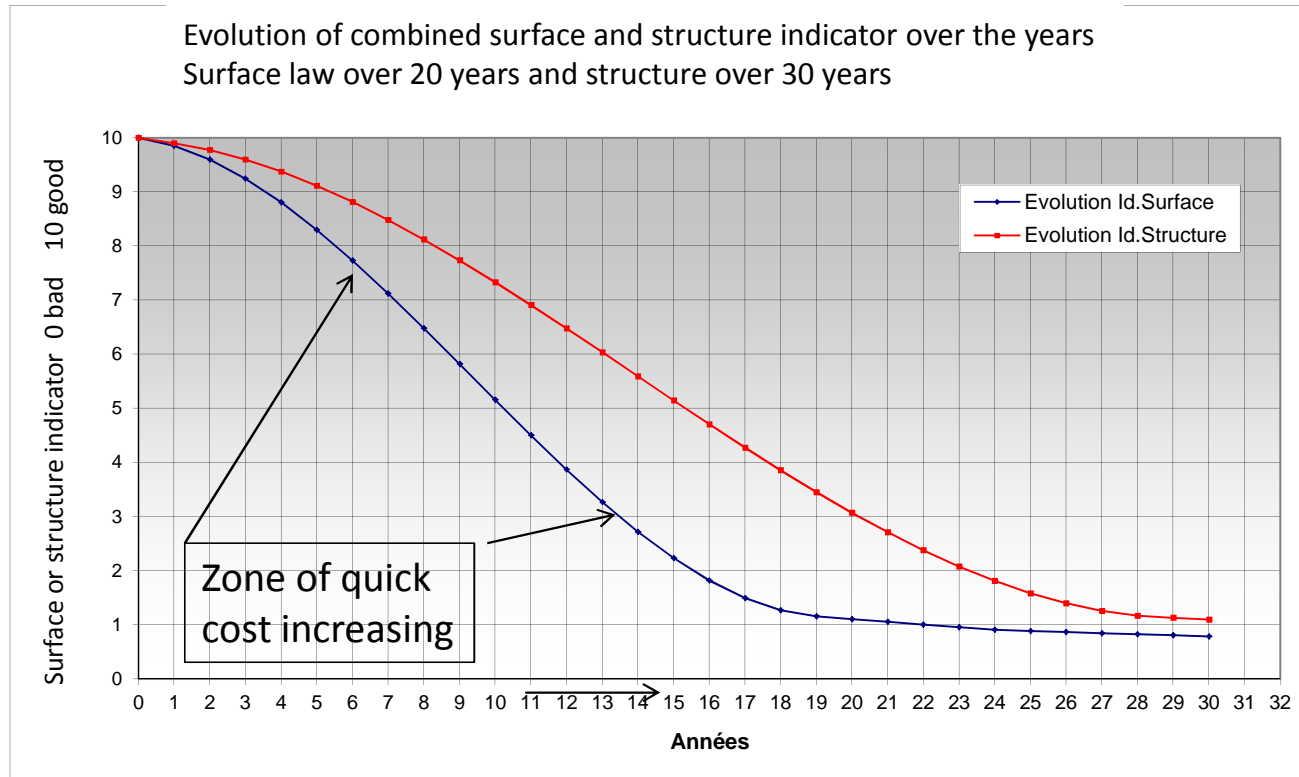
Other sections quite good became not
So good during this time and not so good
sections became quite bad

Alternative

Section not so good first because with less
money it possible to save it

And evolution of rehabilitation cost is quicker

Section in bad condition will not cost more
some years after
Some safeguard and waiting works needed



CONCLUSION

Future is clearly to re-think maintenance policies, introducing long term forecast, as well as financial approach.

Embedding this third dimension on a sufficiently long-term basis, for a term of office, for example, needs to better reconcile the technical trade-offs and policy issues.

Thanks for your attention !

New assessment vehicle,
Constructed end 2014 for a foreign customer,
by the Vectra group

Vectra Germany (L&P) and Vectra France

www.groupvectra.com

[www.vetrafrance.com/vetra-ingenierie-routiere](http://www.vectrafrance.com/vetra-ingenierie-routiere)

