Reference to the call for tenders: Life+

Owner
Madrid

Consulting engineer

Alternative solution proposed by :
Mael test validation

SEVE
Eco-comparateur

1. Summary

2. General information about the software

2.1. SEVE origin

In order to be in a position to bid with a new set of ecologically-minded evaluation criteria, the members of the French Road Builders' Federation (USIRF) have developed a new eco-comparing software tool called SEVE, designed for use by the industry as a whole. In short, SEVE is designed for use during the bidding process to compare the impact of environmentally-friendly technical alternatives with initial specifications.<br\>SEVE compares two technical solutions from the analysis of partial life cycle (LCA) of each of them, in the manner defined below. The solution is called the basis one as described in the tender and (or) solutions (s) variant (s).

2.2. Project cycle

LCA studies the environmental aspects and potential impacts throughout the life of a product including raw materials, production, transportation, use and disposai. The general principle is defined by the standard NF EN ISO 14040: 2006 [5] and EN ISO 14044: 2006 [6] and the list of environmental indicators included in part of the standard NF P01-01O. Companies during the tender can not commit to the frequency of maintenance sequences, so it was decided to work on stroke limited to the partial delivery of the project. It is important to remember: <br\> • The proposed alternatives must offer the same level of service on the same period as the basic solution;<br\> • The tool is an eco-SEVE comparator for comparing two or more solutions as part of the response to tender. It is never possible to use this tool to calculate the environmental impacts of a project so absolute and so it is not adapted to carry out an assessment of greenhouse gas emissions (Carbon Assessment ® OMEGA TP ...).

2.3. The database

The comparison is based on four indicators: the tons of natural materials used in the project, the tons of recycled asphalt (RAP) aggregates in asphalt, energy "process" used by MJ and GHG emissions (in tons CO2 equivalent). The software SEVE is associated with a database of materials, devices, products, ... common to all users and a basic formula of coated specific asphalt plants (means of production of bituminous materials). SEVE can calculate the environmental indicators project based on the cost of specific environmental resources present in these databases. added to the formula; • Distance and type of transportation of raw materials to the job;• Type of fuel; • Tonnage implemented • % of water content • Temperature of the asphalt; • Percentage of RAP added to the formula;

2.4. Available indicators

The comparison is performed on 7 quantitative indicators and 2 declarative indicators have been selected under the voluntary agreement signed with the Ministry of Ecology. (It is important to note that this does not reflect the diversity of potential impacts of projects on the environment) Quantitative indicators: They are composed of an impact indicator defined in the NF EN 15 804 standard and corresponding to global warming (t eq CO2) and 6 other flow indicators: • 1 flow indicator corresponding to the energy " Process • consumed (MJ) • 5 indicators of flows specific to the public works sector corresponding to: o tonne.kilometer o preservation of the resource decomposed into 4 indicators: - Consumption of natural aggregates (t) Consumption of aggregates d (T) - Consumption of cuttings originating and reused within the project (t) - Consumption of recycled materials (t) • Declarative indicators: o Water management o Biodiversity management

The "process energy" indicator (in MJ):

This is the primary energy process that is the sum of non-renewable energy used in the production of the wor1<. A "primary", the energy input in order to have energy at the end customer. The term "process", the energy actuaily consumed: it does not recognizes the energy field

The Indicator "GHG emissions" (ton C02 equivalent) :

This indicator reflects the impact of climate change. We sum the flux corresponding to the emission of greenhouse gases in the air for ail the materials used but also ail operations required for the project and ail transportation. This indicator takes into account the emissions of C02, CH4 and N20 missions in C02 equlvalents

The resource preservation indicator (t)

• Consumption of natural aggregates (t): This indicator counts the tons of natural aggregates consumed on the construction site, which makes it possible to measure the quantities of natural aggregates saved • Consumption of aggregates of asphalt (T): This indicator records the quantities of re-used asphalt aggregates in the formulation of hot, warm and cold bituminous materials, thus highlighting the true valuation of aggregates and bitumen • Consumption of cuttings Reused in the project (t): This indicator records the quantities of cuttings produced and reused in the project, which highlights the savings in natural aggregates to avoid the permanent disposal of these materials. Recycled (t): This indicator records the tons of recycled materials consumed on site. Of the indicator " cuttings originating and reused within the project " because only recycled materials outside the project are mentioned, with the exception of " aggregates of asphalt ".

The indicator "Tonne kilometer" (t.km)

This indicator is a measurement unit for a quantity of transport representing the transportation of one ton over one kilometer and is given in "ton.km". This indicator only applies to road transport trucks taking into account upstream and downstream distances (supply of raw materials + delivery of materials on worksite).

The water management indicator (4 levels of commitment):

This indicator reflects the level of commitment of the company in its offer to conserve water resources and to enhance the capacity of companies to use recycled water on projects (water from temporary or final drainage basins And process water).

The biodiversity conservation indicator (4 levels of commitment):

At work, companies strive to preserve biodiversity and to preserve the functionality of both terrestrial and aquatic natural environments. The indicator Biodiversity reflects the level of commitment of the company in its offer to preserve this biodiversity.

3. Overview of Solutions

try test	Environmental solution
Roads and Networks	Roads and Networks
Wearing course	Wearing course

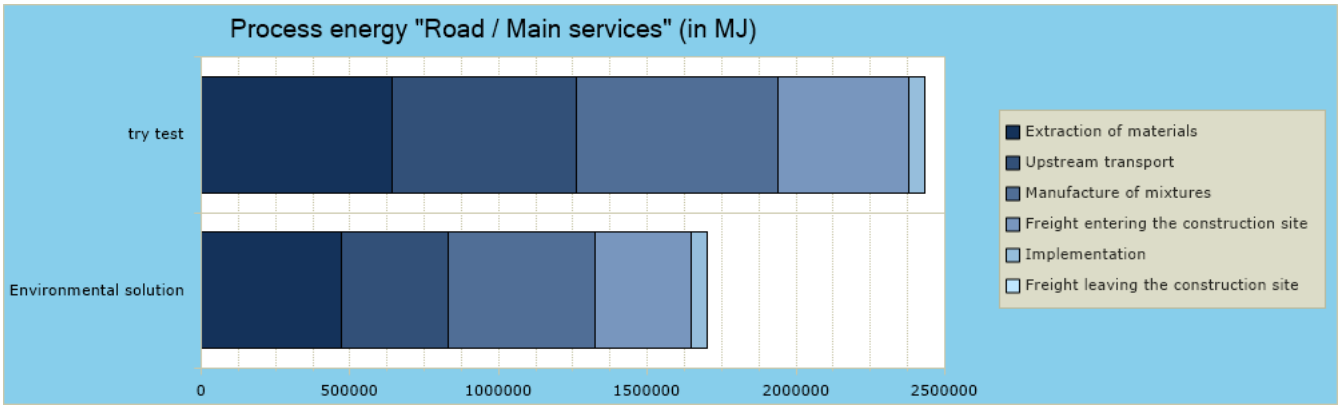
4. Results table

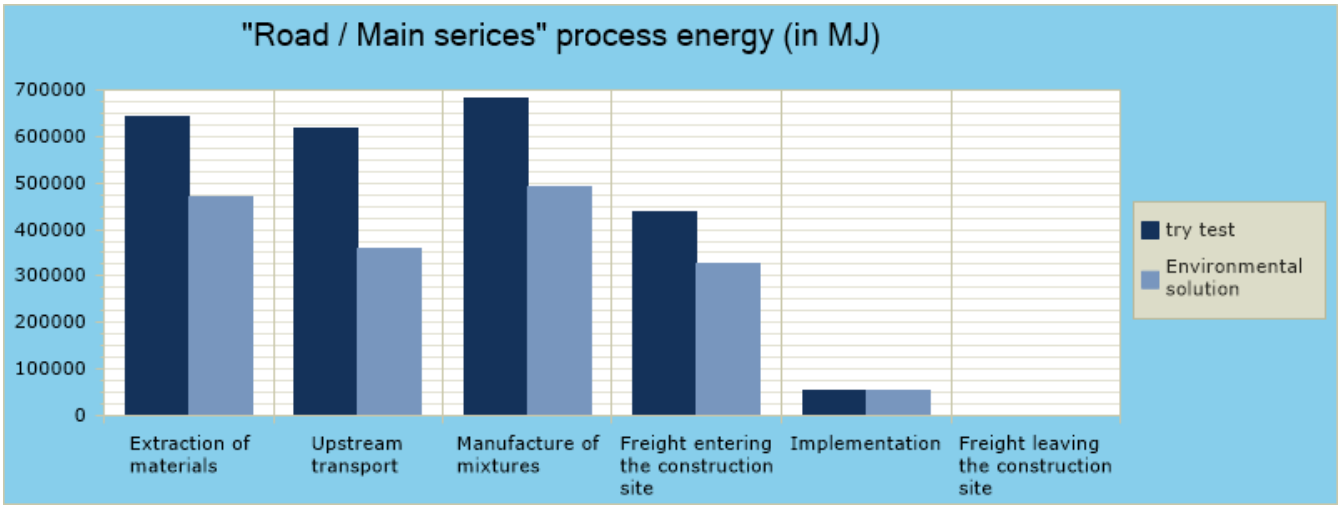
4.1. Indicator: Energy "process" in Mega-Joule (MJ)

The "process energy" indicator in MJ:

This is the primary process energy which represents the sum of the renewable and non-renewable energies used during the construction of the structure. "Primary" means the energy required upstream to dispose of energy at the end customer. The term "process" is understood to mean the energy actually consumed: therefore, energy energy is not counted.

		Process energy (in MJ)							
		Materials extraction	Upstream transportation	Manufacture of mixtures	Freight entering the site	Implementation	Freight leaving the site	Total	Comparison / Base
try test	Roads and Networks	641 865	617 663	681 065	438 342	53 484	0	**2 432 418**	
Environmental solution	Roads and Networks	470 344	359 845	492 615	325 339	53 484	0	**1 701 627**	**-30,0 %**



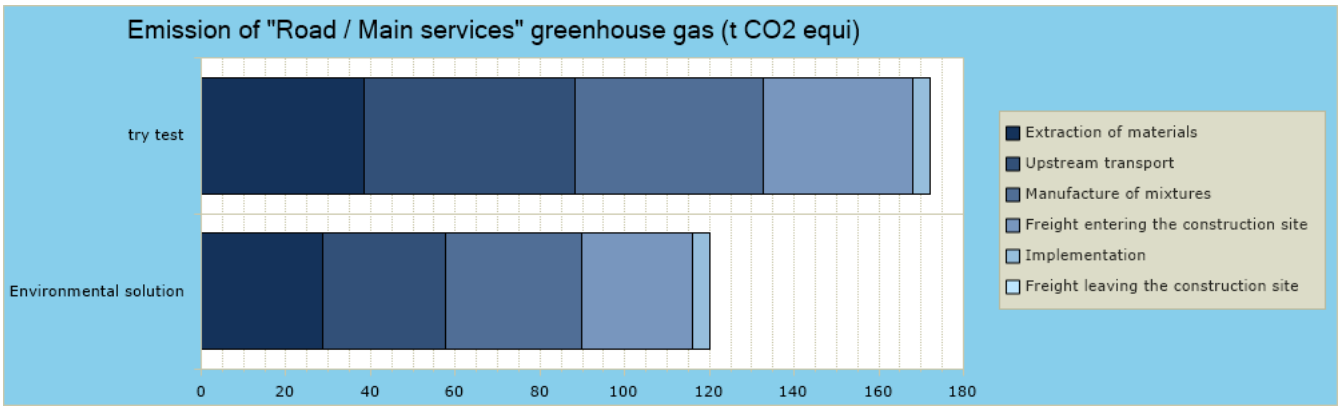


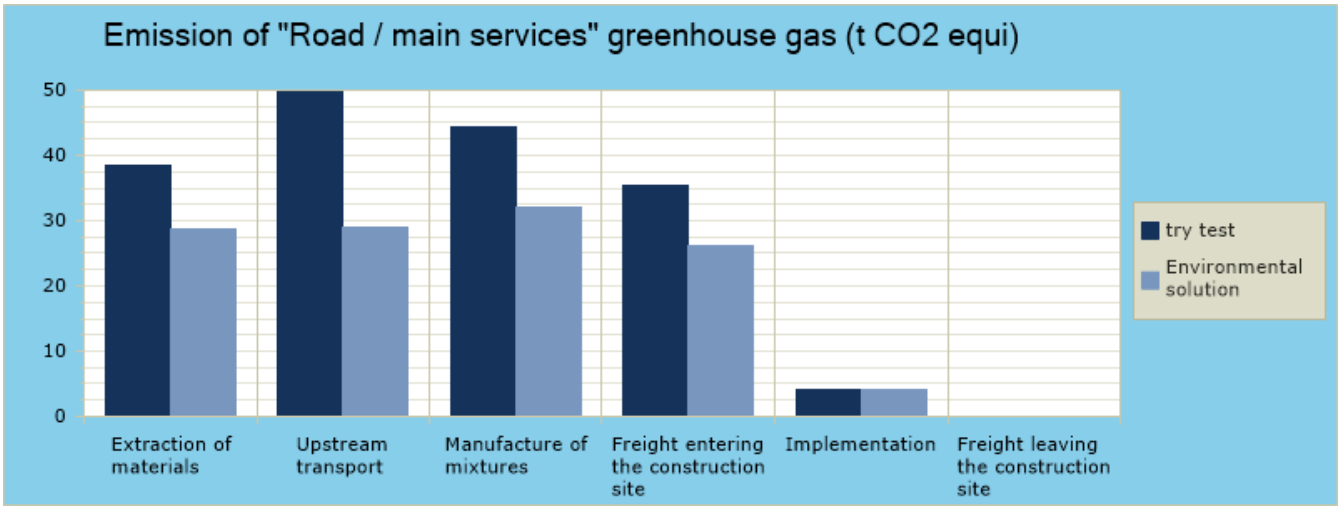
4.2. Indicator: GHG emissions in tonnes CO2 equivalent

The Indicator "GHG emisslons" (ton C02 equivalent) :

This indicator reports on the impact on climate change. The fluxes corresponding to greenhouse gas emissions into the air are summed for all the materials used but also all the operations required for the project and all transports. This indicator takes into account CO2, CH4 and N2O emissions converted into CO2 equivalent.

		Emissions of greenhouse gases (t CO2 eq)							
		Materials extraction	Upstream transportation	Manufacture of mixtures	Freight entering the site	Implementation	Freight leaving the site	Total	Comparison / Base
try test	Roads and Networks	38,6	49,7	44,4	35,3	4,1	0,0	**172,1**	
Environmental solution	Roads and Networks	28,8	29,0	32,1	26,2	4,1	0,0	**120,2**	**-30,2 %**



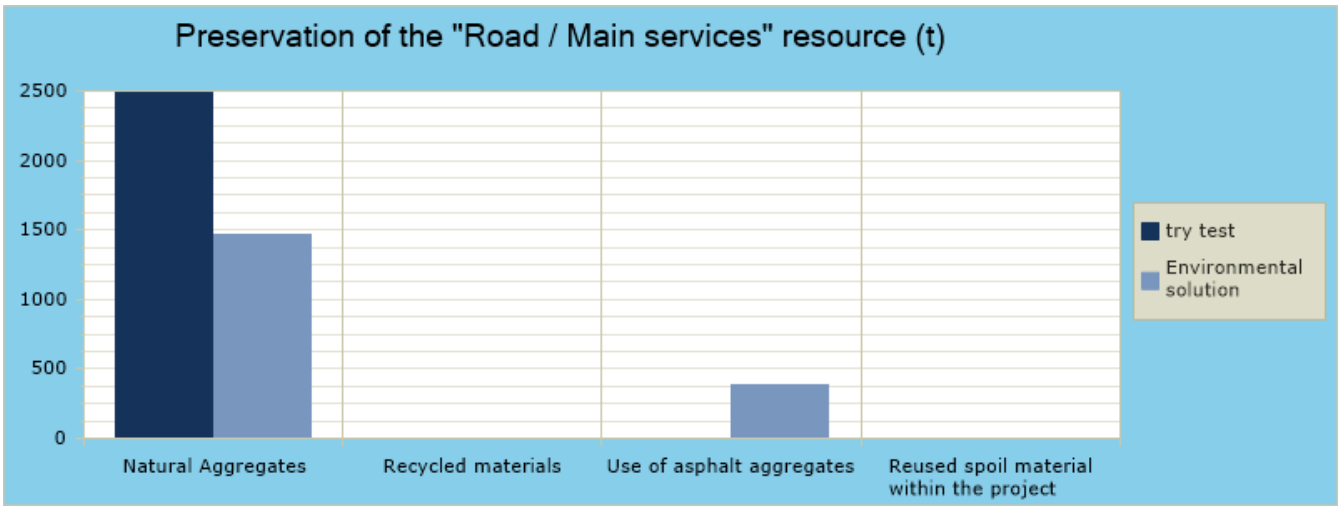


4.3. Indicator: Resource conservation in tonnes

The resource preservation indicator (t)

This indicator records the tons of natural aggregates consumed on the site. Different from the basic solution, this makes it possible to measure the quantities of natural aggregates saved.

		Preservation of the resource (t)			
		Granulats naturels	10ZQSD182	10ZQSD183	10ZQSD184
try test	Roads and Networks	**2 498,5**	**0,0**	**0,0**	**0,0**
Environmental solution	Roads and Networks	**1 464,0**	**0,0**	**390,4**	**0,0**
Comparison / Base	Environmental solution - try test	**-41,4 %**	**Not applicable**	**Not applicable**	**Not applicable**

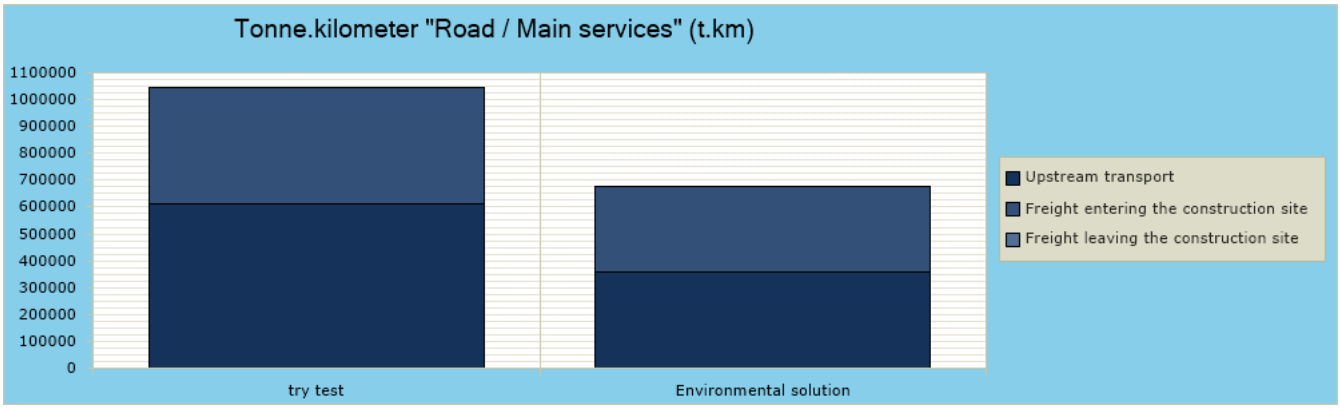


4.4. Indicator: Tonne.kilometer (t.km)

The indicator "Tonne kilometer" (t.km)

This indicator reports on the preservation of the road network or the reduction of discomfort to the user, which translates into tonne-km. This indicator is calculated by multiplying the tonnes transported by the number of kilometers traveled: "the tonne kilometer is a transport unit corresponding to the transport of one tonne over one kilometer".

		Tonne.Kilometer (t.km)			
		Upstream transportation	Freight entering the site	Freight leaving the site	Total
try test	Roads and Networks	611 475,0	433 950,0	0,0	**1 045 425,0**
Environmental solution	Roads and Networks	356 240,0	322 080,0	0,0	**678 320,0**
Comparison / Base	Environmental solution - try test	**-41,7 %**	**-25,8 %**	**Not applicable**	**-35,1 %**



4.5. Additional information: Energy equivalents

The number of induced trucks

The number of induced trucks is calculated by multiplying the tonnage of materials transported by road (downstream + upstream) over an average distance equal to 50 km. The whole is divided by an average truck equivalent to 24t.

Camions Induits	
	10ZQSD194
try test	10 958
Environmental solution	7 320

The number of roundtrip Paris-Bordeaux car compares

The amount of greenhouse gas emissions can be reduced to a round trip between Paris and Bordeaux by city car (emission of 100g CO2 / km).

10ZQSD191	
	10ZQSD192
try test	1 434
Environmental solution	1 001

5. Detailed description of solutions

Legend
The texts written in yellow are established by the SEVE user.
The texts written in green correspond to USIRF data entered.
The texts written in blue correspond to resources created and justified by the company.
The texts written in red correspond to created ressources without justification.

5.1. try test

5.1.1 Wearing course

Incoming materials	Quantity	Work unity	Density	Unit environmental cost	Transportation
EIFFAGE ASEFMA	2630	t	-	See list of formulas used	Transport by semi truck 24t : 165km

Pieces of equipement	Quantity	Work unity	Unit environmental cost
(Equipment spreads) Paving spread 700 t/day	4	Day	USIRF base : " Paving spread 700 t/day "
Paver (15-20 t)	1	Unit	USIRF base : " Paver (15-20 t) "
Vibrating tandem V1	2	Unit	USIRF base : " Vibrating tandem V1 "

5.2. Environmental solution

5.2.1 Wearing course

Incoming materials	Quantity	Work unity	Density	Unit environmental cost	Transportation
EIFFAGE ASEFMA Environmental	1952	t	-	See list of formulas used	Transport by semi truck 24t : 165km

Pieces of equipement	Quantity	Work unity	Unit environmental cost
(Equipment spreads) Paving spread 700 t/day	4	Day	USIRF base : " Paving spread 700 t/day "
Paver (15-20 t)	1	Unit	USIRF base : " Paver (15-20 t) "
Vibrating tandem V1	2	Unit	USIRF base : " Vibrating tandem V1 "

6. List of asphalt formulas used

6.1. EIFFAGE ASEFMA

PlantAsphalt plant (Mobile plant)	Location of the plant
Fuel for plantNatural gas - 50%	
Manufacturing temperature:170 °C	

Products	%	Water content (%)	Unit environmental cost	Transportation
Bitumen (asphalt cement) 20/30	5%	0%	USIRF base : " Bitumen (asphalt cement) 20/30 "	Transport by 24t tanker truck : 50km
Added Filler	15%	1%	USIRF base : " Added Filler "	Transport by semi truck 24t : 200km
Natural aggregates	80%	1%	USIRF base : " Natural aggregates "	Transport by semi truck 24t : 250km

6.2. EIFFAGE ASEFMA Environmental

PlantAsphalt plant (Mobile plant)	Location of the plant
Fuel for plantFuel oil - 0%	
Manufacturing temperature:145 °C	

Products	%	Water content (%)	Unit environmental cost	Transportation
Bitumen (asphalt cement) 20/30	5%	0%	USIRF base : " Bitumen (asphalt cement) 20/30 "	Transport by 24t tanker truck : 50km
Added Filler	15%	1%	USIRF base : " Added Filler "	Transport by semi truck 24t : 200km
Natural aggregates	60%	1%	USIRF base : " Natural aggregates "	Transport by semi truck 24t : 250km
Reclaimed asphalt (RAP)	20%	2%	USIRF base : " Reclaimed asphalt (RAP) "	-