

ALTERNATIVE OPERATIONAL TECHNIQUES AT SNCF RÉSEAU

CURATIVE & PREVENTIVE

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UIC INTERNATIONAL WORKSHOP :
WHAT FUTURE FOR HERBICIDES?

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CURATIVE ALTERNATIVE

MAINTENANCE WITHOUT CHEMICALS

ALTERNATIVE METHODS OF MAINTENANCE

➔ Only one industrial method for the operational corridor :

- Cutting (or mowing).

➔ Another technic needs to be more studied :

- Biocontrol chemicals (pelargonic acid).

➔ And maybe 2 more for localized works out of main lines :

- Burning ;
- shaking ground materials.



CUTTING ON TRACKS

- + 2 times per year at least ;
- + Individual tools ;
- + 4 km/h maximal speed (variable) ;
- + Traffic-cut.

Disadvantages :

- Hight cost/low productivity ;
- Risk for breakable components ;
- Tracks which are yet vegetalised will soon get fully green ;
- Other usual cutting tools (flail mower or clearing saw) aren't adapted to ballast...



CUTTING AND MOWING ON PATHWAYS

- + 2 times per year at least ;
- + Bigger individual tools ;
- + 4 km/h maximal speed ;
- + By night or traffic-cut on main tracks.

Disadvantages :

- Hight cost ;
- Pathways which are yet vegetalised will soon get fully green ;
- Tractors with flail mowers are too massive for this work.



BIOCONTROL CHEMICALS

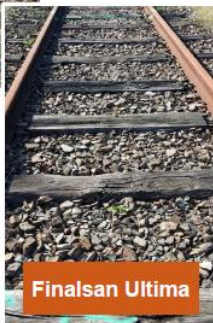
CURRENT TRIALS IN FRANCE

- + Sensitive areas (urban sites, aquifer areas...);
- + Fight against *Ambrosia artemisiifolia*;
- + For now, individual sprayer only;
- + First trial in 2014, to be continued...

- Acide Pélargonique: Efficacité satisfaisante sur l'Ultima, efficacité réduite sur Finalsan
- Glyphosate: Efficacité rémanente. Quelques repousses de Houliques.



Finalsan



Finalsan Ultima



Glyphosate

Zone témoin



BIOCONTROL CHEMICALS

TRACKS AND PATHWAYS

- + No systemic effect : 2 sprays per year, at least.



Disadvantages :

- Biocontrol chemicals are chemicals : prohibited less than 5 m from water ;
- Higher cost and lower efficacy than other chemicals ;
- Need test to adapt our spraying trucks...

LOCALIZED BURNING

SECONDARY TRACKS, PATHWAYS...

- + 4 times per year (north-east of France) ;
- + Individual or tractor-carried burners ;
- + Variable productivity.



Disadvantages :

- High risk of uncontrolled fire during summer and all year long around mediterranean sea ;
- High risk for components of the railway (underground cables, wood sleepers...) ;
- High cost, huge carbon footprint.

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SHAKING GROUND MATERIALS

WIDE PATHES, STORAGE YARDS...

- + two times per year at least ;
- + rotative teeth turns plants over ;
- + Around 1 000 m²/hour maximal productivity.



Disadvantages :

- Hight cost ;
- Can help seeds to germinate if it rains during the days after...



CONCLUSION

Curative alternative technics mean :

- + Higher cost (but we aren't able to determine it) ;
- + Enormous workforce and management ;
- + Worse result ;
- + Higher risk for workers and tracks components...

We are not ready for maintenance without chemicals.

PREVENTIVE ALTERNATIVE - GEOTEXTILE ON PATHWAY

LAYING ANTI-VEGETATION SCREEN ON TRACKS IN SERVICE

PRIORITISING THE ISSUES

Track

- Effect of mulch on recent drained track
- No herbicide treatment for 5 to 10 years, then biannual treatment

Pathway

- Fine materials retaining water
- Deposited organic and semi-organic material from the surroundings
- Systematic annual herbicide treatment



➔ PRIORITY TO PATHWAY SOLUTION

- treated annually regardless of type or age of track

➔ MANAGEMENT OF TRACK UNDER STRONG CONSTRAINTS:

- In regeneration only : impact on output of multi-train track renewal
- Approval of manufactured products: resistance to piercing

STUDY OF SOLUTIONS

SEARCH FOR OPTIMUM EFFECTIVENESS/ COST / SERVICE QUALITY

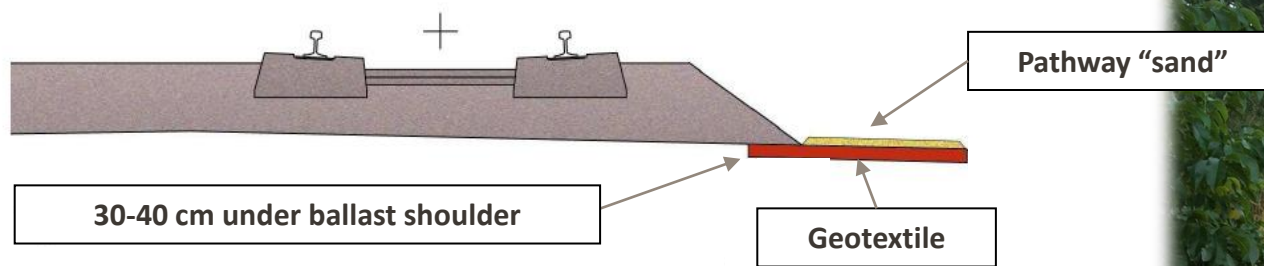
Comparative overview of manufactured products on the market

- Categories of products
 - Watertight geomembranes (PVC-P, EPDM, Bitumen, etc.): anti-rooting effect associated with impermeability (no capillary openings enabling root penetration).
 - Separation or filtration geotextiles, impermeable or permeable.
- Anti-root capacity : current standard (roof sealing - NF EN 13948) + supplier tests
- Adaptability, resistance to piercing and traction, conditioning, durability, etc.
- Environment friendly (anti-root property of some geomembranes achieved using additives... herbicides!)
- Laying:
 - Uncovered thick materials or “carpet”
 - Thin or UV-sensitive sheets, to be covered with granular material
- Total cost product + installation

➔ Optimal product selected : non-woven thermo-bonded geosynthetic polypropylene
➔ Collaboration with DuPONT® for appropriate dosage / treatment

PRINCIPLES OF INSTALLATION

- recommended for important main lines: perimeter of abstraction of drinking water
- carried out during regeneration: timing of works + safety precautions
- necessarily linked to remaking the pathway



RESULTS AND LIMITS

EXPERIMENT 2011: TRACK 2

15 months



24 months



33 months



- Optimal situation: continuity of geotextile under ballast shoulder
- The root system of the vegetation is superficial : it does not survive the dry season



RESULTS AND LIMITS

EXPERIMENT 2011 : TRACK1

15 months



24 months



33 months



→ Less favourable situation : break in continuity (cable channel between shoulder and pathway)

→ Nevertheless the pathways remain safe to use

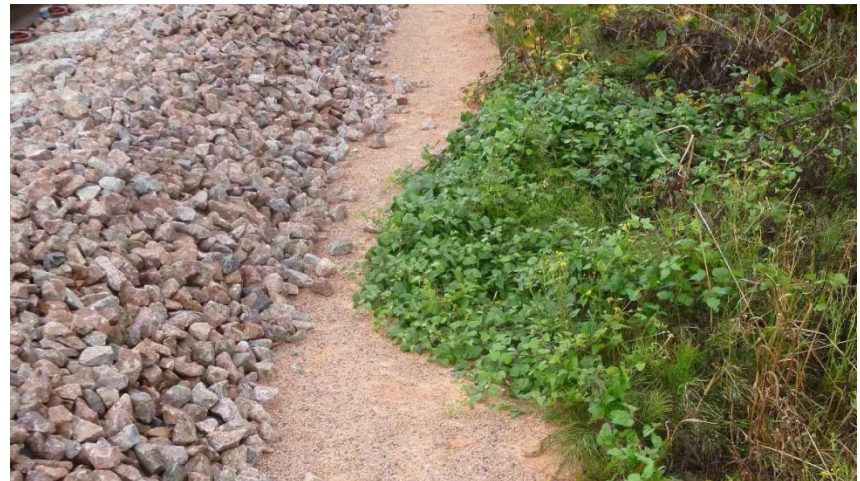


RESULTS AND LIMITS

→ Vegetative propagation of vegetation effectively stopped at the level of the geotextile, but emerging in the body of the track



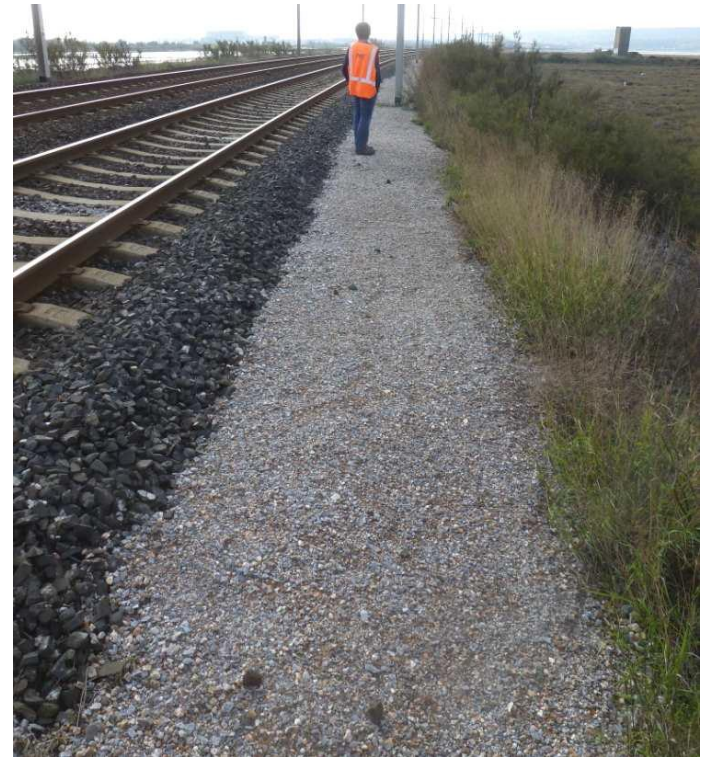
→ Creeping vegetation usually contained by treatment (within treated area): no obstacle to spreading.



→ Maintenance required to keep back growth in these areas

CONCLUSION

- Investment amortised in 3-4 years compared with alternative maintenance
- About 60km carried out or planned to date
- Since 2015: the regeneration programme has incorporated this improvement on 20% of the track



THANK YOU FOR YOUR ATTENTION