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:

- High 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:
- High 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 Houlques.
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.
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:
- High 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
  o Watertight geomembranes (PVC-P, EPDM, Bitumen, etc.): anti-rooting effect associated with impermeability (no capillary openings enabling root penetration).
  o 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:
  o Uncovered thick materials or “carpet”
  o 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

30-40 cm under ballast shoulder

Pathway “sand”

Geotextile
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