

Hydrail: Last Traction Standing



H. Stan Thompson

Presentation to

9th International Hydrail Conference
Neumünster, Germany — 17 June 2014

Nothing lasts forever; certainly no technology does . . . even in the *railroad* industry!

As a *commercial* reality, steam rail traction lasted in the USA for about 120 years.



Diesel has lasted 90.



What will follow diesel in the big geography countries?



Not wayside electric:

- Only 1 % of US tracks are electrified today.
- Now costs **€ 4,400,000** per km to electrify in US!
- There are about **371,000** un-electrified US km's.
- Cost of copper has doubled in 5 years.
- Requires power dispatch in real-time.
- Not friendly with intermittent renewables.

What will follow diesel in the big geography countries?

Not natural gas—unless climate science is proved wrong and “carbon is our friend”.

- If diesels are modified to burn CH_4 (or if new CH_4 fleets are deployed and climate science suddenly proves to be correct) *undepreciated loses will be huge*.

- If the Karlsruhe process* can be commercialized ($\text{CH}_4 \rightarrow \text{H}_2 + \text{solid carbon}$) and hydrail is gradually introduced, then the same locomotives can use both extracted *and* renewable H_2 —a seamless transition!



* http://www.kit.edu/kit/english/pi_2013_12783.php

So, indications are that at the end of this century hydrail will be **the only traction technology still in normal service in 2099...and beyond.**



- The hydrogen economy will be mature and hydrail will be a natural part of it. Overhead power? Gone.
- “Steel-wheels-on-rails” are likely to remain viable, just as they have been since the 1830s; maintenance will be automated, though.
- Tunnels and grade separation will be the rule.

PROGRESSSION: THE TRANSITION TO HYDRAIL...



- The interesting “units” of change will not be vehicles or types of hydrogen sources:
- It will be *geographic*.
- Trains, trams, boats and cars will develop as complementary elements in cities sharing the **dominant local hydrogen source**: wind, hydro, tide, nuclear (*Mais, bien sûr! Pourquoi pas?*)
- Their peripheries expand and eventually join, as the *telephone network* did in the 1800s and the *power grid* in the 1900s.

Scale affects sequence...

- park scale (Taiwan, since 2007)



- mining (South Africa, now)



- trams (Spain)



- commuter rail (Japan, JRE)



- Road Switcher HH 1205 (shunting engine)
Vehicle Projects, Inc. – Dr. Arnold R. Miller
- In service since 29 June, 2009
- Funded by US Congress through Army
- Doubles as self-propelled emergency power



- Last: high-speed passenger...intercity freight.

CONCLUSION (MY TAKE ON HYDRAIL):

- Hydrail is *bound* to become the dominant form of railway traction—eventually.



- Once that has happened, hydrail will stay dominant *for many decades*.
- The controlling obstacle to hydrail is **not** cost, **not** science, **not** fuel infrastructure, **not any** of the obvious bars to “tech” innovation.
- It’s **media mythology** (the Hindenburg, etc.)

Stan Thompson

Mooreville Hydrail Initiative

Mooreville South Iredell Chamber of Commerce

Mooreville Morning Rotary Club



1+ 704 664-5486 home/office

1+ 704 458-9410 mobile

hst2nd@aol.com