Subject: Re: How to model speed restrictions for ETCS train categories based on axle load

Posted by Jörgen Strandberg on Tue, 10 Oct 2017 08:14:26 GMT

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Hi,

With aid of Dirk Bräuer I have updated the example, with maxAxleLoad values of speedProfiles, ends of speedRestrictions, and leaner id/profileRef values, as attached below.

But I still don't know how to best map between "ETCS baseline2 train categories based on minimum axle load" and railML speedProfiles based on maxAxleLoad.

The current reasoning goes like this:
In the ETCS representation the static speed profile contains no information about axle load. An axle load dependent speed profile specifies from which lowest axle load value it is valid, and the highest axle load value is implicitly specified once another axle load dependent speed profile (with a higher lowest axle load value) exists.
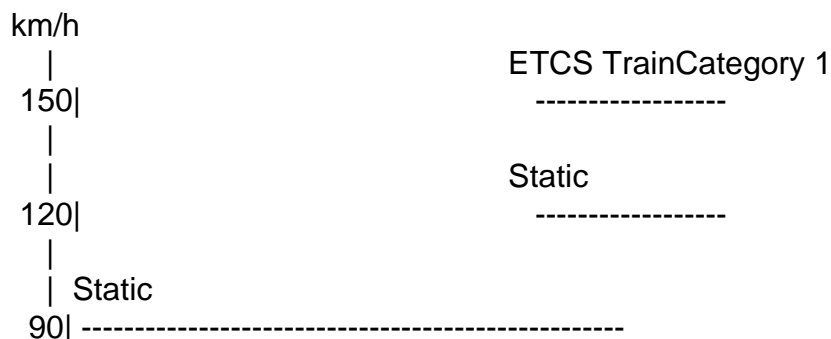
In the railML representation it seems that a static speedProfile is required to specify maxAxleLoad once there is at least one other speedProfile that is based on axle load, since the latter doesn't specify from which lowest axle load value it is valid, only it's highest axle load value. And if this highest axle load value is not known (e.g. because no other axle load dependent speed profiles exist):
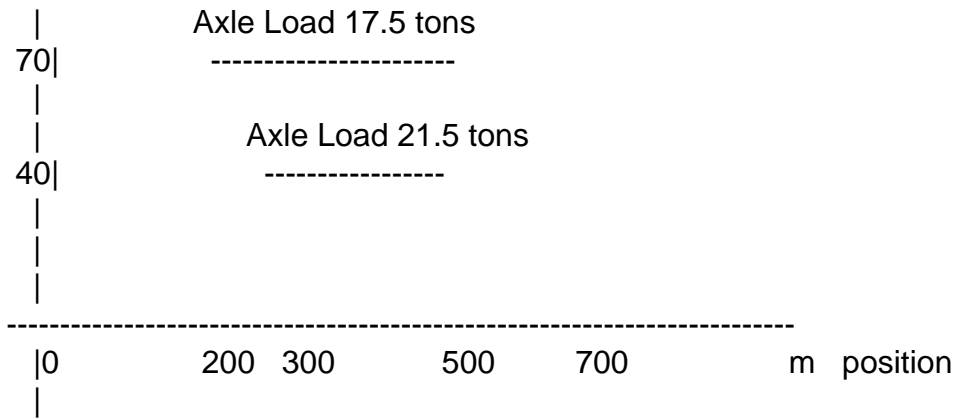What maxAxleLoad value should distinguish the speedProfile, such as the one with id="spB" in the example below?

Example (rev. A)
" Along a railway line, in nominal direction (increasing position values), where the static speed is normally 120 km/h, a length of 700 m is affected by a static speed restriction of 90 km/h. Within this length there is a second speed restriction for trains with an axle load above 17.5 tons and a third speed restriction for trains with an axle load above 21.5 tons. After the 700 m the static speed restriction is lifted and additionally trains of ETCS category 1 are allowed to go at 150 km/h."

Speed restriction

```
  km/h
    |                          ETCS TrainCategory 1
 150|                          ------------------
    |
    |                          Static
 120|                          ------------------
    |
    | Static
  90| -------------------------------------------------
```

```
|           Axle Load 17.5 tons
70|          ----------------------
 |
 |           Axle Load 21.5 tons
40|              ----------------
 |
 |
 |
 ---------------------------------------------------------------------
 |0          200  300      500     700           m  position
 |
```

<?xml version="1.0" encoding="UTF-8"?>
<railml xmlns="http://www.railml.org/schemas/2013" version="2.2">
  <infrastructure description="Example track with speed changes." id="i1" xml:lang="en-us"
name="Straigt Track">
    <tracks>
     <track id="t1" name="BS1_BS2">
       <trackTopology>
        <trackBegin absPos="0" id="t1_b" pos="0">
         <bufferStop id="b1" name="BS1"/>
        </trackBegin>
        <trackEnd absPos="1000" id="t1_e" pos="1000">
         <bufferStop id="b2" name="BS2"/>
        </trackEnd>
       </trackTopology>
       <trackElements>
        <speedChanges>
         <speedChange id="s1" name="spu_1" absPos="0" pos="0" dir="up" profileRef="spS"
vMax="90"/>
         <speedChange id="s2" name="spu_2" absPos="200" pos="200" dir="up" profileRef="spA"
vMax="70"/>
         <speedChange id="s3" name="spu_3" absPos="500" pos="500" dir="up" profileRef="spA"
vMax="999"/>
         <speedChange id="s4" name="spu_4" absPos="300" pos="300" dir="up" profileRef="spB"
vMax="40"/>
         <speedChange id="s5" name="spu_5" absPos="500" pos="500" dir="up" profileRef="spB"
vMax="999"/>
         <speedChange id="s6" name="spu_6" absPos="700" pos="700" dir="up" profileRef="spS"
vMax="120"/>
         <speedChange id="s7" name="spu_7" absPos="700" pos="700" dir="up"
etcsTrainCategory="1" vMax="150"/>
        </speedChanges>
       </trackElements>
     </track>
    </tracks>
    <speedProfiles>
```

```xml
    <speedProfile description="Static speed profile" id="spS" name="Static"
influence="increasing" maxAxleLoad="17.5"/>
    <speedProfile description="ETCS baseline 2 train category with axle load above 17.5 tons"
id="spA" name="Trains 17.5tons" influence="decreasing" maxAxleLoad="21.5"/>
    <speedProfile description="ETCS baseline 2 train category with axle load above 21.5 tons"
id="spB" name="Trains 21.5tons" influence="decreasing" maxAxleLoad="999"/>
  </speedProfiles>
 </infrastructure>
</railml>
```