

Forum posting SpeedProfiles

mandag 2. juli 2018 12.44

B - H of the speed profiles (Further development and definition of the speedprofiles)

I will here dicuss the following:

1. Hierachy of the speed profiles
2. Generic vs. National names
3. Suggestion for slight refactoring and extention of the speedprofiles.

H of the speed profiles

In Norway we have multiple speed profiles that are all NOT continous which overlay.

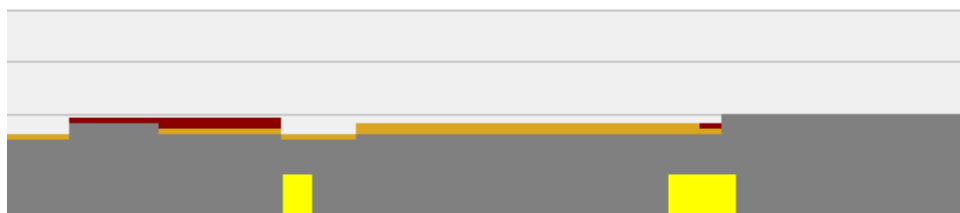


Illustration of Bergenline with basis profile (grey), pluss profile (orange), tilting profile (red) and deflecting speed (IS:connection @maxSpeed), but lets for the example say temporary profile (yellow); mileage in x-axis and speed in y-axis.

Trains in Norway are always certified for more than one speed profile. This as the minimum is the "basis" and the "temporary" speed profiles. Most passenger trains in Norway support at least also the "pluss" speed profile.

So the question is which one is the valid one at a certain point in the infrastructure/ which one to choose.

I will start with an overview of the speed profiles available in Norway:

English short name	Norwegian short	Norwegian long (official)	Influence	Signaled	Presence	Applicable length	Applicable trains	Comment
basis	normal	Normalhastighet		true	almost everywhere/continuous	Next basis	All	Baseline speed
nor:pluss	pluss	Tilleggshastighet	Increasing	true	Sections where possible in whole network	Next basis or pluss	certified passenger trains (including tilting trains with or without tilting activated)	Additional speed to the baseline. Example 90+5=95 (basis+pluss=driveable speed)
nor:tilting	krenge	Hastighet for krengetog	Increasing	true	Sections where possible on lines prepared for tilting on the	Next basis, pluss or krenge	certified tilting trains with tilting activated	

					national network			
temporary	midlertidig	Midlertidig hastighet	Decreasing	true	Sections replacing the basis speed	Defined end	All	
local	Lokale forhold	Avvikende størst tillatt kjørehastighet på bestemte strekninger (SjN 2.2.1)	Decreasing	false	sections	Defined end	All, but different speeds for passenger and freight	As speeds are different for passenger/freight trains (use of @trainUsage) suggest to transfer to speedProfile of name/type "conditional"
avalanche	rasfare	Særlig hastighet grunnet rasfare (SjN 2.3)	Decreasing	false	sections	Defined end	All	Separate speedProfile, but some speedChanges seem to be signalled in Basis profile
conditional		Nedsettelse av største tillatte kjørehastighet p.g.a. særlige lokale forhold (SjN 2.2.2)	Decreasing	false	sections	Defined end		
Nor:TJN			Decreasing	false	continuous	No end	All	No speed information given. Vmax="40"

Conditional speed Profiles

The simplest solution is to create specific speed profiles with a defined condition that are specifically referenced from a train under TT or a formation of vehicle under RS. I do not suggest to reference the trains, vehicles or formations from the speed profile as the profiles do not know about trains, vehicles or formations, but trains, vehicles or formations know about the speed profiles.

Alternatively a new attribute <speedProfile @type="conditional" would indicate that the conditions in the speed profile need to be mapped to the properties in the RS. This would require some additional extensions to cover all conditional properties in the speedProfile in Norway at least.

The conditional speed profiles are for branch lines, section of lines or local speed restrictions that apply under the following different conditions:

- Direction
- Axleload
- vehicle id/name (but this is just instead of using a generic value like axleload - so mapping can be omitted)

- If the train is a passenger or a freight train
- if the freight train is loaded or empty

These values are all already definable in railML with the usage of or the extension of:

Direction

use <speedChange @dir>

Axleload

use <speedProfile @maxAxleLoad>

vehicle id/name

not covered, but do not map to

passenger or a freight train

Create new sub element <speedProfile/trainCategoryRef @ref> and map in TT:category

@trainUsage the trains in TT and/or the formations/vehicles in RS to the TT:category.

Alternative create <SpeedProfile @trainUsage> and <formation @trainUsage>

loaded or empty train

Create new subelement <speedProfile/trainCategoryRef @ref> and map in TT:category @deadrun the trains in TT and/or the formations/vehicles in RS to the TT:category.

Alternatively create <SpeedProfile @deadrun> and <formation @deadrun>. The added value of mapping the @deadrun is that the software will know if to use bruttoWeight or tareWeight for it's calculations.

As mentioned these extensions are not needed if we require the user to reference the speedProfile in the train under TT or a formation of vehicle under RS. Something that would be possible with the initial suggested extension in this thread.

Further I suggest to move @etcsTrainCategory from <speedChange> to <speedProfile> as this is a generic property of the speedProfile and not each SpeedChange.

As earlier mentioned the need to clarify @etcsTrainCategory reference to name "international train category number"

Should there be an additional new attribute <speedProfile @etcsOperationalTrainCategory referring to ANNEX B - list of ETCS operational Train categories in addition to @etcsTrainCategory?

I suggest to add the attribute <speedProfile@cantDeficiency for clear definition of the requirements for the speedProfile when not using the ETCS categories (independent if they are written).

I also suggest to move the attribute <speedChange @signalised to <speedProfile @signalised>.

Alternatively to create a copy <speedProfile @signalised> for a generic approach to the speedProfiles properties instead of each single speedChange.

Length of a speedProfile

To the question how long does the speedProfile extent I would say to the next <speedChange> with the same profile. This either being a new @Vmax value of a changed speed value or the "end" value. With the "end" value the profile ends. It is resumed when a new <SpeedChange> with the same profile is present.

So we in Norway suggest to end speed changes for speed profiles that end/are not continuous.

Previously we continued the speed profiles by writing in the valid speed profile value for all speed profiles if they did not differ (for instance basis/pluss/kreng = 40/40/40).

This is somewhat in conflict with the latest implementation of the use of the values "end" under <speedChange @Vmax=>. As the development of the value was, in my opinion, not documented transparent (in forum, wiki or community), I deem it OK to suggest a refactoring before it's implementation. Alternative the now suggested meaning of "end" (end last speedChange and resume the SpeedChange before that) could still apply if used in the "basis" profile. The same function would, though, be available using an overlay speed profile (for instance in the levelCrossing temporary speed reduction example in the simple example).

Choice of overlying speedProfiles

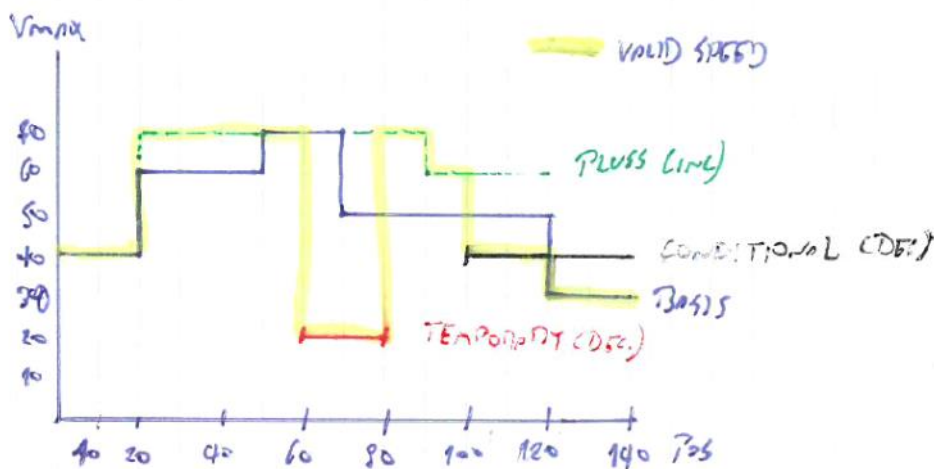
As there is not necessary a given fixed hierachy in the overlaying speedprofiles. We need to define a hierachy rule for the software to choose the correct speedprofile if more than one is present. Example is a decreasing speedprofile for heavy freight trains of continous Vmax=60 on the line. If the basis speed profile is above 60 then the heavy freight train profile is valid and if the basis profile is bellow 60 then the basis profile is valid.

I suggest the following hierachy:

Selection of Vmax for a specific train at a specific point in the infrastructure:

1. Filter the valid speedprofiles present in infrastructure with the valid ones for RS and/or TT.
 - a. Check for all speedprofiles present in the curent position in the infrastructure.
 - b. Check for speedProfiles present in the RS of the formation
 - c. Check for speedProfiles present in the TT of the train
 - d. Make intersection (Schnittmenge) of IS, RS and TT speedProfiles
2. Of these remaining speedProfiles choose the following:
3. If one or multiple speedProfiles with influenc="decreasing" is present use the speedProfile with the lowest speed (the current speedChange value).
4. If no speedProfile with influenc="decreasing" is present and if one speedProfile with influenc="increasing" is present use this.
5. If no speedProfile with influenc="decreasing" is present and if multiple speedProfiles with influenc="increasing" is present use the speedProfile with the highest speed (the current speedChange value)
6. If no speedProfile with influenc="decreasing" and "increasing" is present and there is only one speedProfile with no set @influence then use this.
7. If no speedProfile with influenc="decreasing" and influenc="increasing" is present and there is multiple speedProfiles with no set @influence then use the speedProfile with the lowest speed (speedChange).

Example:



C - National vs. Generic speed profiles.

The wiki for <speedProfile> (<https://wiki.railml.org/index.php?title=IS:speedProfile>) shows a Best practice with the Speed profile names "basis", "tilting", "temporary" and "heavyLoad".

I understand them as international values as they are written in english and use generic terms. But as some of the values have conditions attached to them that might differ from nation to nation and even from line to line I suggest to use different terms here.

Thus I suggest the following clearer term development for <speedProfile @name>.

Stage 1: term recomendation in the wiki.

The profiles that have no conditions and are thus valid for all trains (certified on the line) for a continuous present in time and distance for a baseline speed use the international term "basis".

Norwegian example: "Normal hastighet"

The profiles that have no conditions and are thus valid for all trains (certified on the line) and are NOT continuous present in time or distance use the international term "temporary". Norwegian example: "midlertidig hastighet".

All other speedProfile names use the national prefix and the national short name. For instance "nor:krenge" for norwegian tilting speed profile. This as a term recommendation in the wiki in a first stage. Also we should have a wiki page for the used values to create an enumeration list in stage 2.

Stage 2: use enumeration list

When we have mapped the internationally used speedProfiles, we can add `<speedProfile @type="enumeration list">` and use the valuelist for the international speed profiles as the enumeration list in addition to :other (for anything not mapped in stage 1) and the value "conditional" for conditional speed profiles.