Vampire Development Plans

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- Vampire V7.10 – Enhancement update
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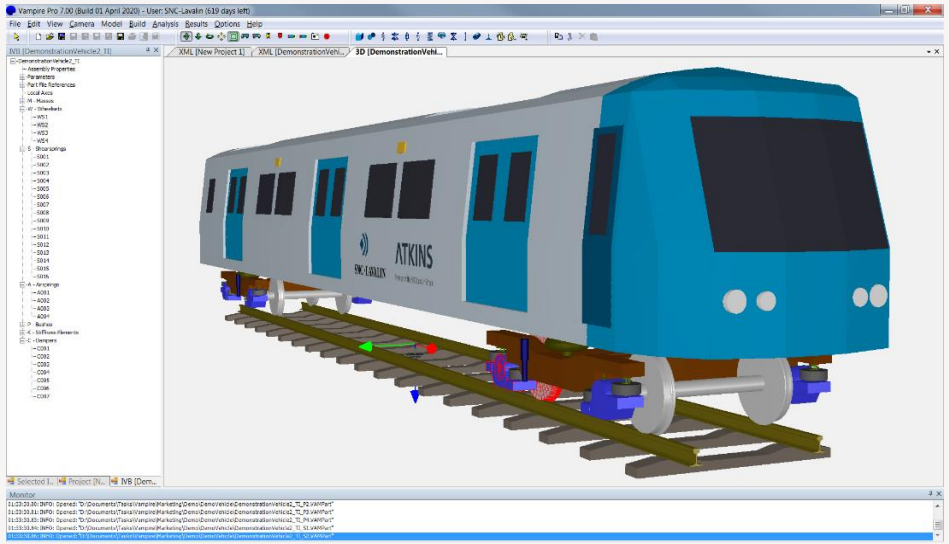
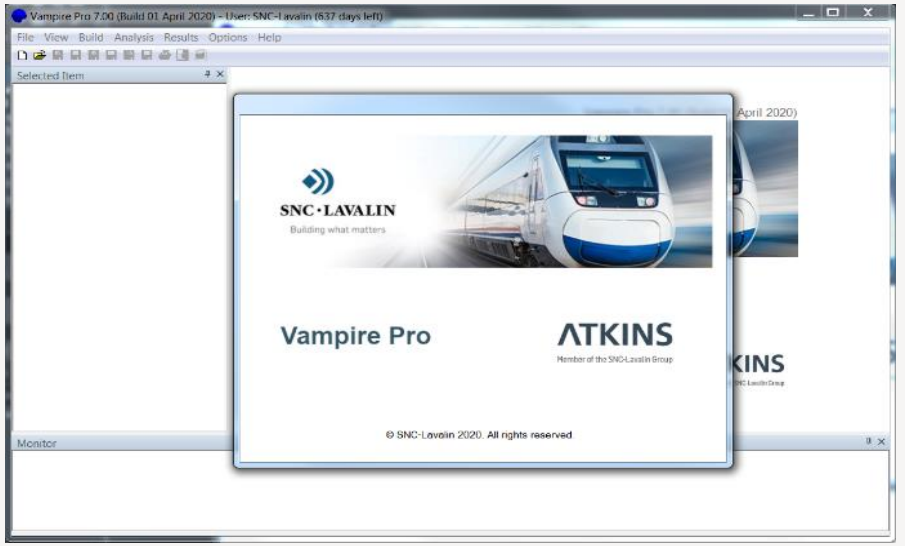
- Maintenance and Change Requests

Vampire V7.00 – SNC-Lavalin

- April 2020 - Vampire Pro rebranded and released as Version 7.00
- Still some work to do on documentation, icons and logos
- Please request your copy vampire@snclavalin.com





Vampire V7.10 – Enhancement Release

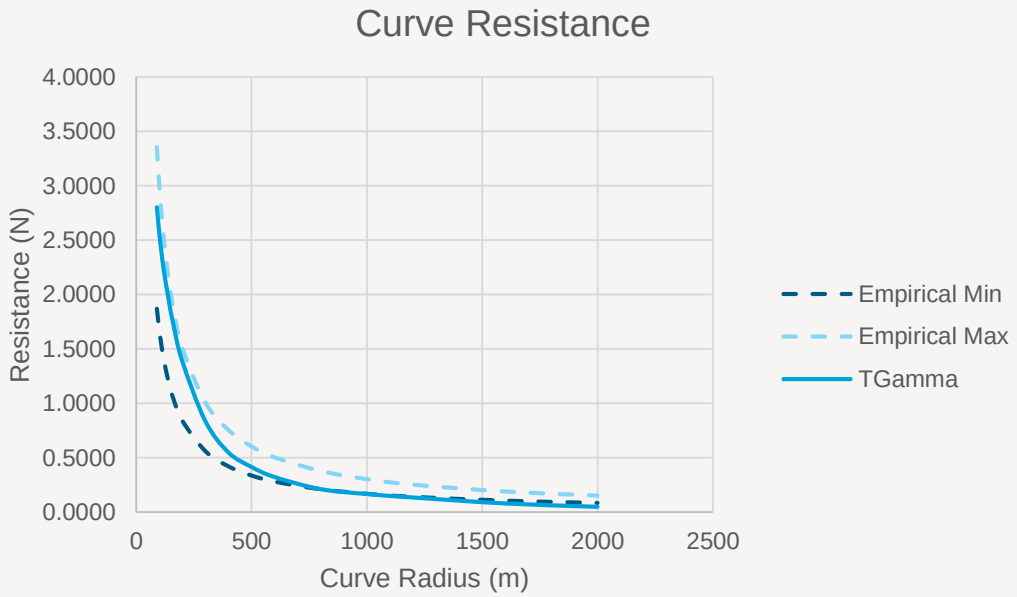
- Work has commenced on V7.10
- Requirements have already been documented
- Coding is underway
- Expected release Q4 2020
- Marks a divergence from previous versions of VAMPIRE®

Vampire V7.10 Features

- Proposed Enhancements
  - subject to technical specification and review

- Longitudinal Dynamics Enhancements
  - Curving Resistance Implemented based on TGamma
  - Propulsion Resistance Implemented as a function of speed second order polynomial ($A+BV+CV^2$)
  - Supported in the Run File Editor

- Hysteresis Element Enhancements
  - PRELOAD and CLEARANCE keywords
  - Supported in the Interactive Builder

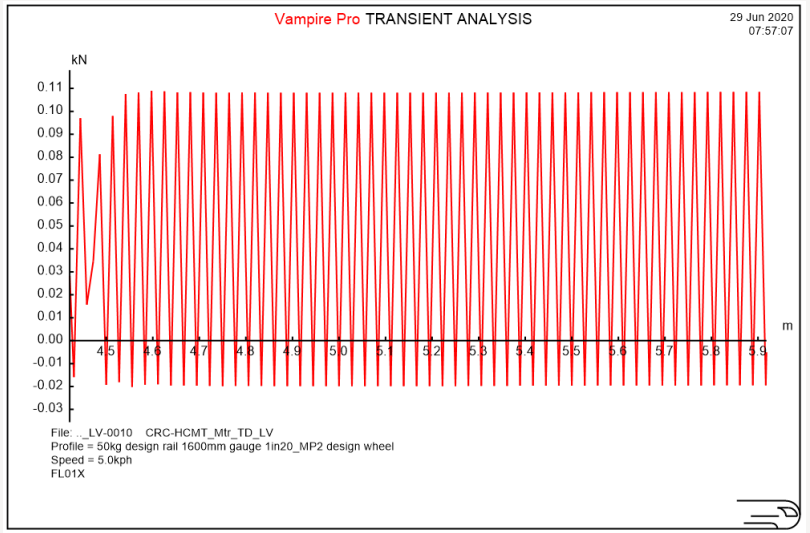


Vampire V7.10 Features

- Check Rail Modelling Enhancements
  - Improved check rail response during loss of contact
  - Re-arranged code to output creepage, creep force and Tgamma on check rail
  - New outputs for above and check rail displacement
  - Improved creepage expressions for contact data grooved rail flangeback contact

- Improved Contact Data Generation Calculation for Yawed wheelsets
  - Calculation tolerances adjusted
  - Minimum number of points in a profile increased to 500 using curve fitting

- Wheel Rail Contact Numerical Stability Checker
  - Based on wheel longitudinal creep force.
  - Counts sawtooth peaks over 80% of saturation limit



Vampire Plot

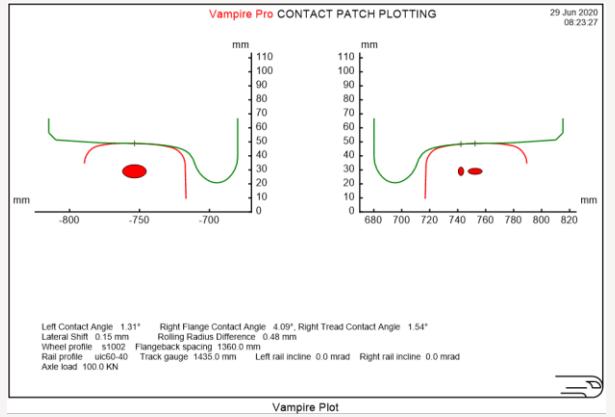
Vampire V7.10 Features 3/4

- Revised Sperling Ride Index Calculation
  - Various interpretations as Ride Index has evolved for numerical analysis
  - Squared and Cubed implementations get slightly different results
  - Results can vary slightly based on timestep due to FFT analysis method
  - Summation method implemented

- Flange Two Point Contact Output Below 30 Degrees
  - Traditionally the Vampire Contact Calculation assumed flange contact above 30 degrees.
  - In V6.30 (Nov 2014) method changed to lateral movement of contact patch position
  - Allowing tread two-point contact zones
  - Simulation is correct for a tread/flange two-point contact zone below 30 degrees
  - However result saved to incorrect output terms
  - Correction requires addition of new section to contact data file

- Minor Enhancements
  - Smaller change requests and enhancements

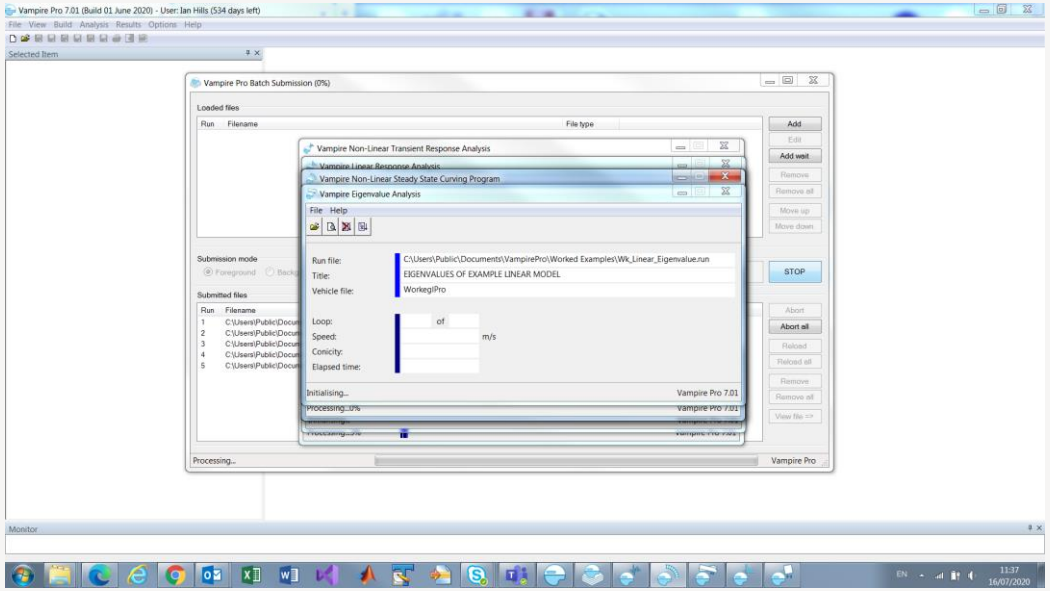
```
**
*TWOPOINT
SINGLE ABOVE 15.00 Deg
**
*LATERAL OFFSET
**    YREL      DRL       DRR
```



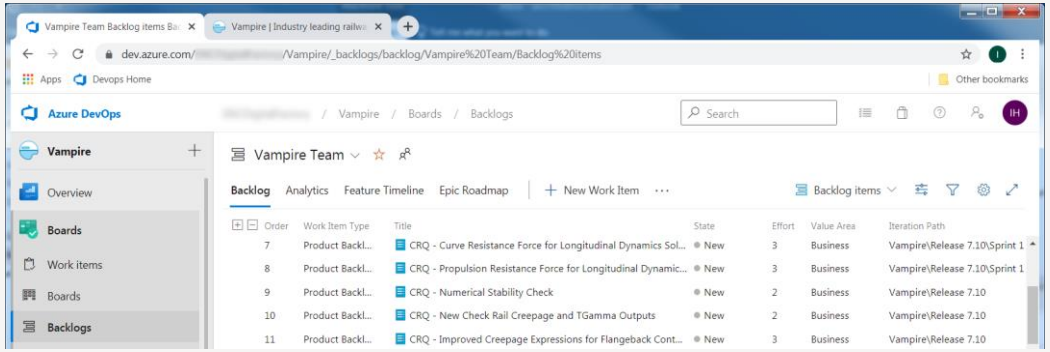
Vampire Plot

Vampire V7.10 Features

- Completion of Rebranding
  - Images in the Vampire manuals
  - Logos and icons used within the package
  - Images and colours used by the Installer program



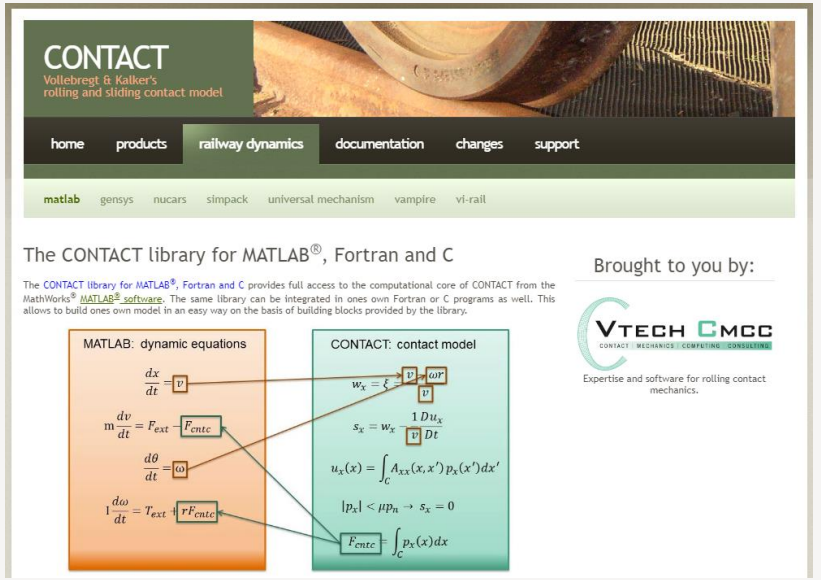
- Product managed using DevOps
  - Controlled source code changes
  - Management of change requests



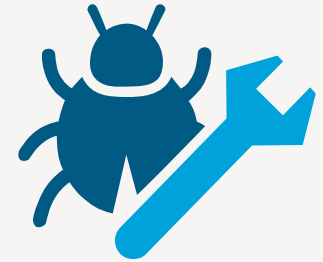
Vampire Major Update

- A Major Update
  - Anticipated scoping of project in 2021
  - A significant move away from previous versions of VAMPIRE®

- Proposals
  - In-Line wheel rail contact calculation based on current Vampire Hertzian contact method
  - In-Line wheel rail contact solution based on CONTACT (edwin.vollebregt@cmcc.nl)
  - Enhanced track flexibility model allowing different track forms to be modelled
  - Re-write Line Element code for position format keeping link equations

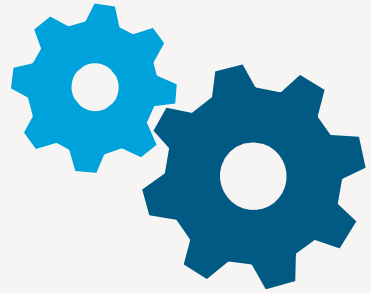


Reporting and Fixing Bugs



- If you discover a bug in the software, please report it via the Vampire helpdesk
- Please report it even if you think the bug is already known about:
  - We may not know of bugs inherited from pre-SNCL versions of the software
  - If multiple users are having the same problem this will help us to prioritise which bugs to fix first
- Reported bugs will be checked and prioritised:
  - Rare critical bugs which could affect the validity of results are the highest priority, and if one is discovered we will notify other users and fix it with a patch or new release
  - Most less critical bugs will be fixed in the next scheduled release
  - Minor issues associated with the user interface may not be such a high priority, and we will address these in future releases when the relevant parts of the code are overhauled
- We are still keen to hear about bugs in the legacy versions of Vampire, as these may persist in subsequent releases:
  - SNC-Lavalin will aim to fix bugs in our version of the software but we cannot offer patches to fix bugs in earlier non-SNCL releases

Requests for Changes and Enhancements 1/2



- We are always keen to hear your ideas for improvements to Vampire
  - We are currently creating a list of change requests at SNC-Lavalin
  - We're actively working on 15 of these at present, some will be in V7.10, others to follow
  - SNC-Lavalin needs to prioritise which enhancements to address next

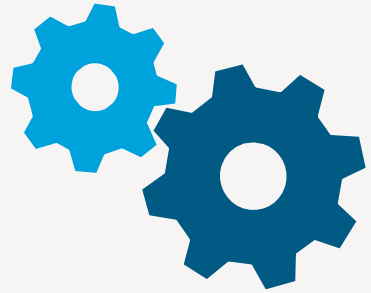
- It is unusual to get the same request more than once – users all have different priorities!
  - This can make it difficult for us to justify investing heavily to develop a niche capability
  - The more requests we get, the more justification for investment

- If clients have a particular niche requirement, we are open to collaborating on a joint project to deliver that capability within Vampire or in connection with other software – please ask

- For software developments of broader interest funded from our development budget, it is more efficient to address a group of issues while overhauling a particular area of the package
  - For example in V7.10 we are focusing on the check rail code, addressing 6 change requests

Requests for Changes and Enhancements

2/2



- Which areas do YOU think we should focus on next:
  - Pre-processors
  - Graph plotting
  - Post-processing, filtering and statistics
  - Track modelling
  - Vehicle model elements
  - Command file capabilities
  - Manual
  - Training courses
  - Error checking and reporting
  - Track and profile libraries
  - Anything else

Q & A

Thank you

Our values are the essence of our company's identity.
They represent how we act, speak and behave together,
and how we engage with our clients and stakeholders.

SAFETY	*We put safety at the heart of everything we do, to safeguard people, assets and the environment.*
INTEGRITY	*We do the right thing, no matter what, and are accountable for our actions.*
COLLABORATION	*We work together and embrace each other's unique contribution to deliver amazing results for all.*
INNOVATION	*We redefine engineering by thinking boldly, proudly and differently.*