Working Group Meeting - χMCF Standardization

>>> Minutes <<<

on Dec 11. 2019, 10:00am – 4:00pm
John-Andrews Development Center, Cologne
(Spessartstr., 50725 Cologne)

Summary presentation on χMCF Standard Updates (V3.0.1)
(Beta CAE, N. Economidis)

- Access of working status possible via GitHub (https://github.com/economidis-nick/createXSDforxMCF)
- Discussion on <stacking> element
  - Optional <stacking> to describe the sequence of parts in a joint incl self-connections (self-connection: joint includes partners w/ the same part index)
  - Confirmed that the <part index> numbers are arbitrary and do NOT define a connection sequence
- Discussion on Threaded Connections; Bolts vs Screws
  - Current definitions of bolts & screw has been aligned with wiki definition (bolts need a nut…)
  - However, there are still discrepancies to some OEM usages (especially NA regions: bolts need a female thread; however, this can be a nut OR a thread in a connected part)
- Discussion on Friction & Contacts
  - Friction definitions within a <threaded_connection> have been improved by separating properly friction in the thread, between head/nut & washer and between washer & first part (details see v3_0_r1_changes_since_may_2019.pdf)
  - Additional change proposal: thread friction definition in <contact_list/> can be omitted; thread friction definition as attribute in the <threaded_connection/> tag is sufficient; to be used for static & kinetic friction (<threaded_connection length=”50” static_friction=”0.8”>)
- Discussion on attribute “pid” in <parts>
  - Magna brought up the issue that PID (alphanumeric variable) cannot be used in combination with ABAQUS as properties are labeled by names (string variable)
  - It was recommended to introduce the option to also define a “plabel” or similar to overcome this limitation
  - “plabel” needs to be added in all tags where currently <pid> is used across the entire document
- Discussion on <femdata/> import & export
  - Import and export of <femdata/> should be controllable by Processors, ie.
    - offer switch for <femdata/> export OFF / {Solver-Names}
    - offer switch for ignoring <femdata/> import

3DExperience Platform / Catia – Strategy for Management of Joining Data (Dassault, S. Trahan, L. Feuvrier)

- Luc Feuvrier showed, how joining data can be handled in upcoming versions of CATIA along with the 3DExperience platform
- 3DS/Catia provides a fastener template that allows to include required joining data
- Data model could be made compatible with xMCF ("should not be too difficult") – but no decision yet
- Automated generation of joints possible
- Next: Gap analysis required to assess differences between current implementation (template or fastener data model) vs xMCF

Status & Needs Analysis - Pre Processing Efficiency for Weld Fatigue Assessments (BMW, N. Himmelsbach)

- Nils Himmelsbach gave a short overview on the implementation status of the various joining types in the CAE process at BMW
- He also requested that the FE representation (or realization) of seamwelds should also include the A-measure as a variable in the FE realization (is being used in the fatigue postprocessing)
- Michael Tryfonidis also requested as result from a running BMW project to include additional 3 joining types, which are:
  - Self-Clinching Bolt / Screw
  - Clinch Nut
  - Friction Stir Welds
- Nick Economidis suggested to
  - Try to develop a proposal for the above mentioned 3 joining types
  - Discuss a generic approach to enable individual users/companies to add own schema portions ahead of formal implementations into the overall standard (compatibility must be secured)
  - Timing for this was ~end of Jan 2020
- Nils Himmelsbach requested commitment from WG members (Software Vendors & OEMs) for ongoing xMCF support. Commitment was given again.

Weld Fatigue Assessments w/ Superelements using χMCF, ANSA, xcontools (VW, G. Zhang, K. Troendle, L. Kaps)

- Genbao Zhang & Karin Tröndle showed how they use xMCF for their CAE process using Superweld (with ANSA)

Use Cases for χMCF, Deployment Status & Challenges (Ford, U. Fox)

- Ulrich Fox gives an overview which fastener types generate what amount of inefficiency at what step in the PLM chain
- It emphasizes that xMCF is only one enabler for a full seamless process from CAD down CAE & Manufacturing
- Authoring processes need to be defined for all joining types
- Immediate usage of xMCF would focus only on the CAE side (PDM2CAE and CAE2CAE)

Implementation Status of χMCF Standard in Pre/Post & Fatigue Software

- Siemens
  - Ambiguity detected in the connection_group description (between picture & text); requested to correct
  - Discrepancy detected between intention of xMCF and Siemens programming wrt part indexing; confirmed that the agreements for xMCF are to use the index only for local referencing within the given <connection_group>; also no further meaning for sequencing or similar
  - Question was raised if we can provide a contact in case of questions from external users
- Magna
  - 8 seamweld types are now supported by FEMFAT; additional types can be supported per customer requests
  - <appdata> used to specific FEMFAT needs
  - Development ongoing

Work Items / Next Steps

- ISO-Standardization
  - continue preparing input for ISO; doc will be shared with team for alignment - *Matthias Weinert*
- Storage Location for Schema File and Examples
  - where can schema file and example files being stored along with the xMCF main document; clarifiy with FAT/VDA – *Matthias Weinert*
- Bolt & Screw definition and description for Threaded Connections
  - Can we live with the current definition or do we need to change? – *all*
  - Discussion to be continued in next workshop
- Attribute "PID" for <parts>
  - Introduce an attribute "plabel" or similar to allow compatibility to programs like ABAQUS which use string variables to identify properties etc – Nick Economidis (?)
- FE representation of seamwelds
  - Consider the A-measure as variable that influences also the FE model of the seam weld; do not use a standard or default value (BMW request) – *Altair, Beta, …*
- Gap Analysis (3DS fastener data model vs xMCF)
  - Planned – *Luc Feuvrier*
- Resolve ambiguity of the description of <connection_group> in the document (Section 2.4) - *Nick Economidis*
- Should we publish a Contact for external Users (external to the Working Group)? – *to be discussed in the next Workshop*
- Validators for XML 1.1 only available for Java, not Xerces-C++ (issue for Magna) – *Beta will check if a stripped schema (w/o assertions) can be provided in XML 1.0 as well*
- Remove thread friction definition from contact list and use only the attribute within <threaded_connection> - *Nick Economidis*
- Discuss generic approach how to tackle introduction/usage of new connection types for individual users (OEMs, SW Vendors) before formal incorporation into the Standard – *to be discussed in the next workshop (end of May)*

Next Workshop / Meeting

- 27.5.2020; ProStep, Darmstadt