xMCF 3.0.1
document changes

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Description of Changes:

Contents:
- Minor Changes
- Adoption of Conventions
- Noteworthy Changes
- Important Changes, for discussion
- Other Requests

Attached documents:
- all_changes.doc
    - contains all changes from v3.0 document

- important_changes.doc
    - only noteworthy and important changes

Minor Changes:

- typos

- grammar

- examples
  - xml was invalid

- missing rows from most tables
  - e.g. femdata

- missing descriptions
  - e.g. weld position, element femdata

Adopted Conventions:

- Change of 'Status' into 'Use' (section 3.1 and heads of most tables)

- Type **Numeric** turned to **Integer** and **Floating Point** accordingly

- Multiplicity & Optional   (multiplicity column of most tables)
  e.g.

	element	multiplicity	use
Table 1	date	0-1	Optional
Table 51	bolt	1	Required
Table 51	washer	1	Optional

used one convention:

	element	multiplicity	use
Table 1	date	**1**	Optional
Table 51	bolt	1	Required
Table 51	washer	1	Optional

Noteworthy Changes

- Rivet hardness (Section 7.4, 7.4.2)
  - 'hardness' was available under <self_piercing> rivet only.
  - 'hardness' now moved under <rivet>

- Custom Attributes: <integer>   (Table 20)
  - replaced <integer> with <int> because
      all examples used <int>
      ANSA v19 already writes using <int>
      Symmetry: <int_list> is used – not <integer_list>

- Part Code of weld-nuts: (section 7.5.5)
    Is there any reason why a **welded nut** or **clipped nut** should <u>not</u> have part code?

- Empty <nut> element: (Table 56)
    Empty </nut> is permitted. So I made it **optional**.

```
<threaded_connection>
  <bolt/>
</threaded_connection>
```

vs

```
<threaded_connection>
  <bolt>
    <nut/>
  </bolt>
</threaded_connection>
```

Noteworthy Changes

- <clinch>   (section 7.7)
    - *punch_diameter* turned to *button_diameter*

- <heat_stake>   (Table 66)
    If given, should *head_height* be permitted to be 0 ?

- Multiple <loc_list> in connection_1d (Section 8.1.2 and Table 73)
    - description provided

- *gap* in <sheet_parameter> (section 8.2.4.3.1)
    - text states that it cannot be zero
    - zero is now permitted.

- Section "Laser" (section 8.2.4)
    - Not used at all in examples nor text
    - Should I delete it ? otherwise in *which* seam subtype ?

- Corner Weld (section 8.2.6)
    - Added graphic and description for **double corner** weld as well
    - No change in xml schema

Noteworthy Changes

- all technology types are now available to *every* seaweld subtype: (8.2.5.3
    - ***resistance /arc / laser / friction / brazing***
    - flared joint was missing *laser*
    - why restrict it in schema?

- K-Joint, Cruciform Joint (Table 111, Table 115)
    - ***gap / sheet_thickness / sheet_angle*** made optional
    - in all other seam subtypes it was already optional

- K-Joint, Cruciform Joint (Table 111, Table 115)
    - ***thickness*** renamed to ***sheet_thickness***
    - in all other seam subtypes it was called ***sheet_thickness***

- <hemming> (Table 126)
    - ***top_index*** and ***bottom_index:*** added missing definitions
    - already existed in examples
    - necessary when defining an adhesive in a 3-sheet hemming connection.

Important Changes, for discussion

Contents:
- Competing contact definitions
- Connection without connected partners
- Bolt vs Screw
- URL of schema
- schema version vs document version

Important Changes, for discussion

Competing Local Contact Definitions (sections 5.3.2 vs 7.5.2)

Section 5.3.2 defines
- A **global contact** under `<connection_group>` and
- A **local contact** under `<connection_xd>`

Section 7.5.2 defines
- A has an **alternative, *competing*** local contact under `<threaded_connection>` only.
  It appears that this has been written to take care of contacts
  between **thread**, **nut**, **head** and **washers**.
  But it also handles the connected parts, using a different definition.

  We only need the way it defines the thread friction.

  What should we do ?

Proposal & Description in issue #27:
https://github.com/economidis-nick/createXSDforxMCF/issues/27

Important Changes, for discussion

connection without connected partners (Table 10)

```
    </connected_to>

Instead of

    <connected_to>
        <part index="1" label="PART_7000400"/>
        <part index="2" label="PART_9000900"/>
    </connected_to>
```

i.e. <part> and <assy> are *optional*.

Rationale:
It is possible that at an initial / intermediate state, connected sheets are not set.
At later stage (e.g. solution) software should check that <connected_to> is not empty!

NB: Failure to validate means that format is not xMCF3.

Important Changes, for discussion

Bolt vs Screw (Section 7.5.6.1 example 4)
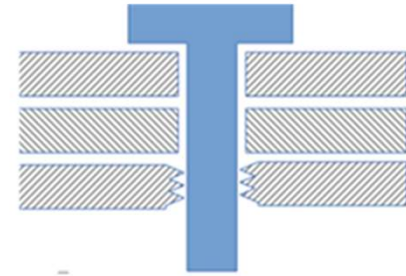
Initial state:

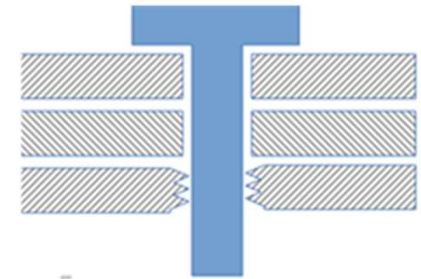- This was encountered

Figure 23: Screw without nut

Example:

```
<connection_0d label="135">
    <threaded_connection diameter="10.0" length="50.0"
        head_diameter="16.0" head_height="5" thread_length="35"
        torque="80" angle="30" pretension="1200" part_code="M10x50 12.9" >
        <normal_direction x="0" y="0" z="-10"/>
        <!--No Washer under bolt ehad in this case-->
        <bolt fixed_to="3" >
            <!--No Nut in this case-->
        </bolt>
    </threaded_connection>
     <loc> 1500.3809  838.75885   730.6529 </loc>
    <appdata>
         ...
    </appdata>
</connection_0d>
```

Important Changes, for discussion

Bolt vs Screw (Section 7.5.6.1 example 4)

Fixed to:

- <screw>

- No need to mention nut

    Do you agree ?

Figure 23: Screw ~~without nut~~

Example:

```
<connection_0d label="135">
    <threaded_connection diameter="10.0" length="50.0"
        head_diameter="16.0" head_height="5" thread_length="35"
        torque="80" angle="30" pretension="1200" part_code="M10x50 12.9" >
        <normal_direction x="0" y="0" z="-10"/>

        <screw base="3"/>

    </threaded_connection>
    <loc> 1500.3809   838.75885   730.6529 </loc>
    <appdata>
        ...
    </appdata>
</connection_0d>
```

Important Changes, for discussion

Bolt vs Screw difference: (section 7.5.1)

Statement in xMCF 3.0 document:

7.5.1 Introduction

Bolts and screws are probably the most well-known connection techniques,

- A screw has a tapped bore.
- A bolt needs a nut.

Confirmation needed:
- Is this statement still true ?
- Is it correct ?

Quotes from previous meetings:

- bolts do not drill their holes

- bolts can be replaced many times in the same hole

- screw assemblies are not meant to be replaceable/fixable with the same degree of fidelity

- screws drill their own holes or create the holes' thread during screwing

Important Changes, for discussion

Schema definition: (section 5.5)

Statement in xMCF 3.0 document:

5.5 XML Schema Definition

XML-Schema definition (XSD) will be published at <mark>a later time on VDA web server.</mark>

xsd location:
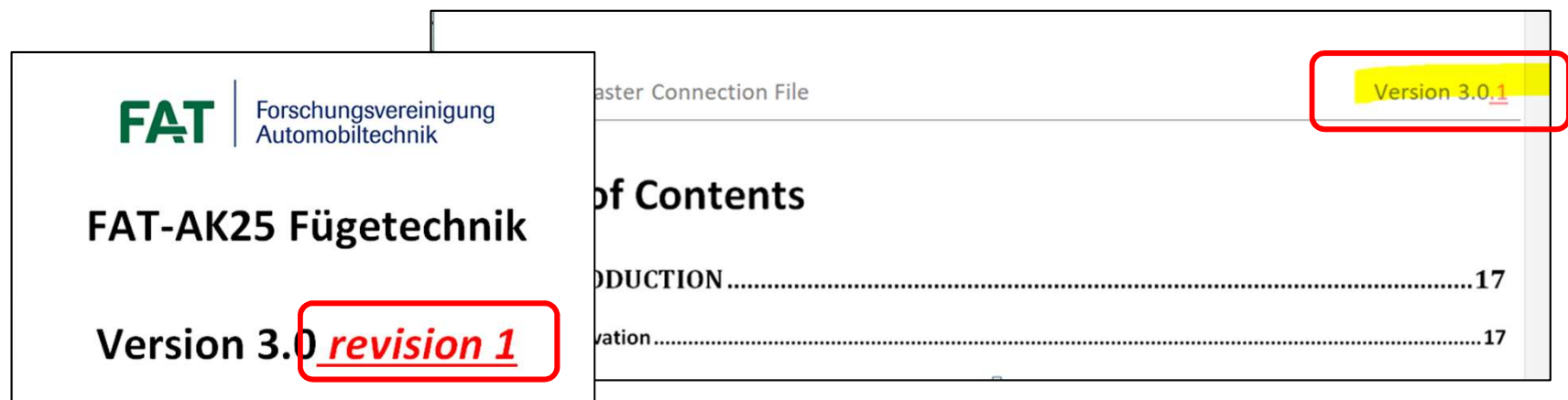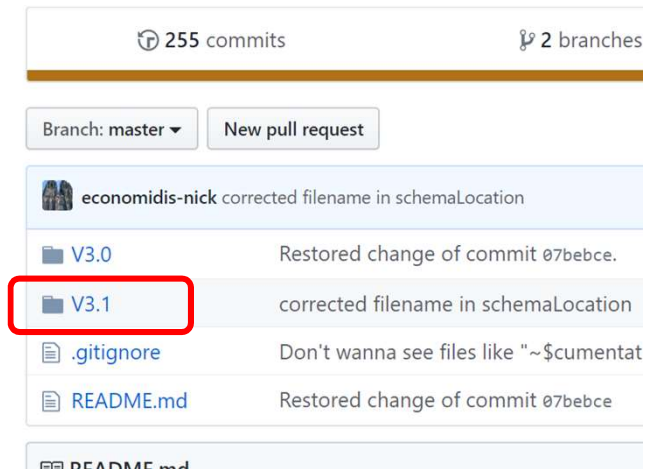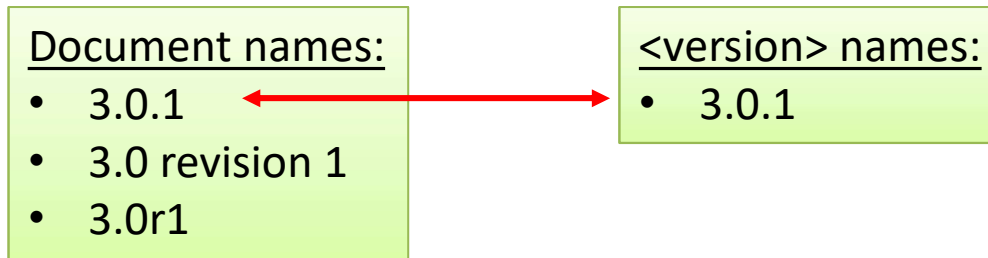- will it remain on GitHub ?
- on which directory ?
  - https://github.com/economidis-nick/createXSDforxMCF

- must we write the URL in the document ?

Name of the document

should schema version and document version be different ?

Document may change but schema may not change:
- perhaps the names should be decoupled ?

Document names:
- 3.0.1
- 3.0 revision 1
- 3.0r1

⟷

<version> names:
- 3.0.1

thank you!