

SCALING FROM ENGINEERING TO MANUFACTURING -CLAAS' END-TO-END PROCESS USING DELMIA



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3DEXPERIENCE Conference 2024

Scaling from Engineering to Manufacturing – CLAAS End to End Process using DELMIA

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Manufacturing Engineering as an agriculture machinery manufacturer is challenging.

In the case of CLAAS we face a broad portfolio with two main business units named Self-propelled Harvesters and Tractors & Implements. In each product family are several types as well as sub-types and in combination with variant configuration there are a lot of common and reused components resulting in enormous complexity. The target of this activity at CLAAS is the change-driven MBOM creation and Process Planning on **3D**EXPERIENCE in a Multi-Model situation. But where to start?

This session shows how expanding the scope from Engineering to Manufacturing is a key initiative for a digital thread from the first planning of a product to its later production using virtual twin experience.

In this context Kai Korthals, VP Systems & Product Engineering, Tobias Berhorn, VP Service Function Release & Product Data Management and Hans-Jürgen Falk, Head of Engineering Solutions, share insights on how Dassault Systèmes and CLAAS work together to identify and plan the most valuable path to make this a reality."



CLAAS presenter Team



Dr. Kai Korthals

System & Product Engineering



Hans-Jürgen Falk

Engineering Solutions

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Tobias Berhorn

Release and Product Data Management



CLAAS 2023 at a glance It is our mission to make farmers more successful through our technology.

XERION



12,131

Innovation



EVION





Digital



Autonomy





Countries



Locations





CLAAS Product family Type – Variant Configuration



AXION 900 TERRA TRAC

Max. output ECE R 120 355 - 445 hp



AXION 900 up to stage V

Max. output ECE R 120 445 hp



Hydraulics





AXION 800 up to stage V

Max. output ECE R 120 205 - 295 hp



ARION 600

Max. output ECE R 120 145 - 205 hp



Cabin & Comfort



20 years in Le Mans



| 5 spool valves, electrohydraulic proportional | Standard | |
|---|----------|------------|
| 6 spool valves, electrohydraulic proportional | | \bigcirc |
| 5 + 2 spool valves, electrohydraulic proportional | | \bigcirc |
| 6 + 2 spool valves, electrohydraulic proportional | | \bigcirc |
| Power Beyond, load-sensing connections without flat face couplers | Standard | |
| Power Beyond, load-sensing connections with flat face couplers | | \bigcirc |
| Power Beyond - Flat face couplers with LS booster | | \bigcirc |

| Comfort seat, fabric, semi-active suspension, heated, swivelling | i | Standard | |
|---|------------|----------|------------|
| Premium seat, leather, semi-act. susp., heated, vent., swivelling | í | | \bigcirc |
| Comfort seat, fabric, semi-active long./horiz. suspension | <u>(i)</u> | | \bigcirc |



CLAAS Product family Type – Variant Configuration – Process Planning



AXION 900 TERRA TRAC Max. output ECE R 120 355 - 445 hp



AXION 900 up to stage V Max. output ECE R 120 445 hp



up to stage V Max. output ECE R 120 205 - 295 hp

AXION 800



ARION 600 Max. output ECE R 120 145 - 205 hp



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CLAAS Engineering From where we come



CLAAS Gesellschaft

Engineering Sites

Importeur

Organisation: independent local RnD Organizations

- Things were developed twice or more
- difficult to develop products following the CLAAS Standard
- no global Ressource Optimization

IT:

Every Engineering location had its own, independent VPM-Server

- only sequentiel Collaboration possible ("Site after Site")
- difficult Management of Data Access
- Update only once per day



CLAAS Engineering How we currently work



Organisation: central Service Unit Engineering



CLAAS Engineering How we currently work



CLAAS Gesellschaft

Engineering Sites

Importeur

Organisation: central Service Unit Egineering

- Things were developed once
- Development following one Standard
- global Ressource Optimization acoording to Business Needs

IT:

Using global 3Dx 24x instance

- live Collaboration across all Sites and Service Units (e.g. Industrialization)
- easy Management of Data Access



CLAAS Engineering Where we aim at





CLAAS manufacturing Main drivers for manufacturing



Worldwide engineering and manufacturing network



Frontloading and simultaneous engineering



Product complexity increase with higher need for worker guidance



CLAAS manufacturing Metadata in use







CLAAS manufacturing Starting situation





CLAAS manufacturing Next target scenario



15 06/11/2024



CLAAS manufacturing Current status





CLAAS manufacturing Key learnings

Efficiency gain by reusage of manufactured items across multiple products

Structural rules for product mBOM & change management by introduction of manufacturing data types

-change management by instance evolve & evolution effectivity (valid from....valid to...)
-change management by revisioning
-configuration management
-scope to physical products (eBOM)

Optimized session building user defined open procedures











CLAAS manufacturing Challenges

Implementation of plant specific attributes on mBOM

- Make or buy attributes in multi plant scenarios (Plant A \rightarrow buy / Plant B \rightarrow make)
- Impacts on process planning for DELMIA & ERP (synchronization of make or buy attributes)

Higher maintenance need for mBOM by including 3D geometry

- Current state: Logistical mBOM (parts)
- Target state: 3D mBOM (parts + position?)
- Impact: Synchronisation eBOM \rightarrow mBOM also for changes in parts position in assembly

Consistent change process from engineering to manufacturing (running changes)

- Synchronizing of parallel engineering changes to mBOM
- In multi plant scenarios with individual application dates







CLAAS Engineering Key Enabler: eBOM with History



Current 3D eBOM process

- Best so Far means: only the last released Engineering contents are available in the 3D eBOM structure
- Last released Engineering = last released Production contents

Challenge:

- No stable input for DELMIA mBOM process in 3D
- No correct 3D representation for any visualization



CLAAS Engineering Key Enabler: eBOM with History



Future global 3D eBoM Process:

- will enable simultaneous engineering • based on defined baselines
- 3D eBOM with history to be filtered by •
 - Model Version / CW
 - **Design Status** •

Tractor process since 08/2021

CLAAS Engineering Enabler: Steeco & Roadmap "3D End to End"

3D End to End Steeco



3D End to End Roadmap



Key-aspects of initiative

- Gather use cases from former Business Units initiatives and local organizations
- Analyze **prerequisites** for use cases
- Analyze **dependencies** between use-cases and prerequisites
- Cross portfolio collaboration via portfolio architect network
- Propose roadmap and projects to SteeCo 3D end2end
- Tracking of projects and evaluation of project progress towards 3D end2end



Outlook, next steps To be become compatible with OOTB





Approva route In_Work Published Engineering done Review done Released Published RP RD ED RO User Action Obsolete' **3DX Maturity** User Action DX-Change-Action a triggered User task Checkla SAP ECO statu O Decisio

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Active





Outlook, next steps 3D digital twin



Reduce data amount to have loadable data in seconds open the door to many processes

- Assembly process in manufacturing
- Service process to found faster system issues
- Simulation in logistics
- \rightarrow to be automated in a workflow process







THANKYOU FOR YOUR INTEREST

Virtual Worlds for Real Life