

RFT-MII Knowledge Gateway with Engineering Lifecycle Management



MSC Software Corporation, the worldwide leader in Engineering Lifecycle Management, would like to share some of our experiences and expertise in the application of Engineering Lifecycle management in the lifecycle and workflow management of RFT-MII Knowledge Gateway

THIS WHITE PAPER introduces Engineering Lifecycle Management solution set in the management of Lifecycle and workflow of RFT-MII Gateway. This system integrated with this highly advanced Gateway provides a clear definition of the important elements of simulation and synthesis in product creation, preferred sequence/flow, clear identification of data models/results and seamless integration of tools to control the process. It enables the usage of all stored data to guide emerging R&D and future method development.

The paper is primarily intended for two type of readers:

ENGINEERING MANAGERS who are involved in managing various phases of design and analytical activities through the application of advanced tools and technologies.

DESIGN/CAE/MATERIALS ENGINEERS who are involved in the day to day product lifecycle activities of Fiber / Textile performance and interested to improve the end quality of products via application of ELM systems.

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CONTACTS

1. RUBENS TALUKDER
SENIOR SOLUTION ARCHITECT, ELM BUSINESS UNIT
MSC SOFTWARE CORPORATION
4675 MACARTHUR CT, NEWPORT BEACH, CA 92660
EMAIL: RUBENS.TALUKDER@MSCSOFTWARE.COM



2. GREGORY PAVICH
ACCOUNT MANAGER, SPACE/DEFENSE SALES,
MSC SOFTWARE CORPORATION
4675 MACARTHUR CT, NEWPORT BEACH, CA 92660
EMAIL: GREGORY.PAVICH@MSCSOFTWARE.COM



1. EXECUTIVE SUMMARY

MSC Software's Engineering Lifecycle Management (ELM) capabilities are among the greatest assets in virtual product development. It has been architected, developed and applied by small to large size corporations globally for over fifteen years – contributing to innumerable creativity and innovations.

ELM is a structured information system which manages the structures of material, product, process and resource simulation information including linkages between information items, attributes about information items as well as the information items themselves. Thus, directly addresses the issue of the traceability of data in complex environment. This is because the system stores the pedigree of the information creation process for each process step from product definition thru design, meshing, model assembly, analysis and experimentation to intermediate and final results. Fig 1 presents the footprint of Global Product Lifecycle management

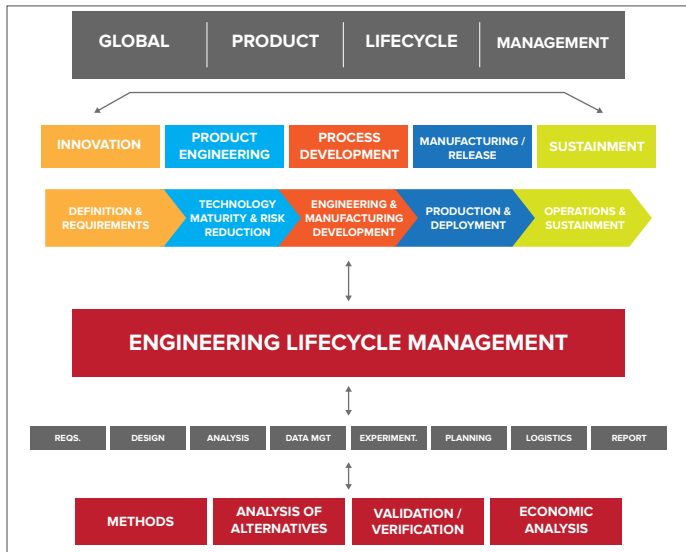


Fig 1: ELM in global product lifecycle management

2. ELM INTEGRATION WITH RFT-MII KNOWLEDGE GATEWAY

MSC Software's ELM platform, subset of Product Lifecycle management, directly integrates with RFT-MII's Knowledge Gateway. Should a Knowledge Gateway be standardized across the enterprise to manage all stakeholders data and processes tightly coupled with PDM/PLM whilst maintaining all levels of IP, ITARS, and EARS requirements, MSC Software' ELM platform serves as the best in class delivery platform of choice. ELM integrates all processes; upstream to downstream in order to establish and integrate an "end-to-end" Engineering & Manufacturing bridge. Fig 2 presents the integration scenario.

1. Upstream processes: Product definition, Solver integration, Materials analysis, Analysis of alternatives and Release of optimized 3D product structure to Product Data Management (PDM)\
2. Downstream processes: Integrate & deliver final process plans (tasks list / "traveler") to shop floor MES.

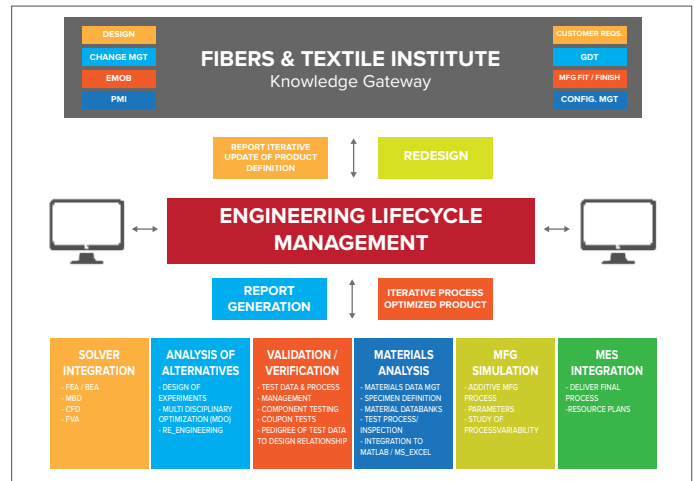


Fig 2: Integration of ELM with Knowledge Gateway

3. VIRTUAL PREDICTIONS OF FIBER/TEXTILE PERFORMANCE WITH ELM/DIGMAT

MSC Software has developed a product called Digimat (short for Digital Materials). By utilizing this tool, users can prescribe a virtual design of experiments (DOE) that allows microstructural properties, such as woven and braided fibers, fiber aspect ratio and volume fraction, to be varied and resulting material properties compared rapidly. For micro-structural modeling, the Digimat-FE tool can create various finite element models of micro-structures, which are used to study the effects that material variations (including defects such as resin rich areas or porosity) have on ultimate material performances.

Digimat can be used to create short, long, and continuous fiber materials. Material studies can be performed quickly by changing the model. When and where required, both single and multiple fibers can be created via Digimat. These models are called representative volume elements (RVEs) and are used for an efficient method of evaluation of various microstructures under consideration. Fig 3 presents the workflow of virtual predictions of material performance.

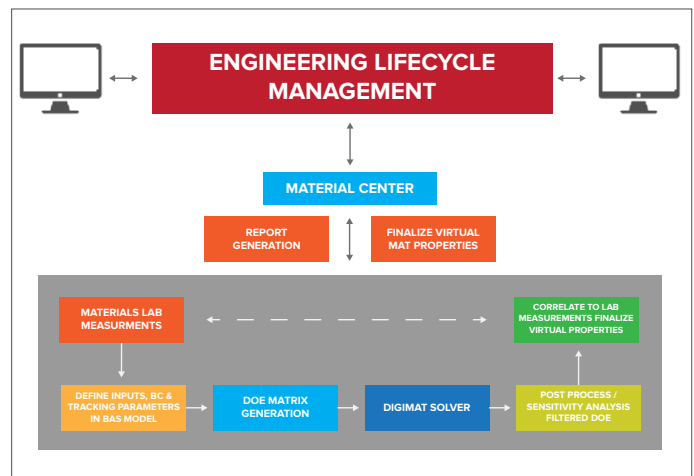


Fig 3: Workflow of Virtual predictions of Fiber performance

4. BUSINESS VALUE OF ELM TO RFT-MII

1. MSC Software's best business practices with the integration of ELM enables organizations to be more dynamic, agile, and innovative across the entire supply chain up and down, across timetables left to right, and across experimentation/testing pre and post. Rapid and seamless integration and knowledge management is priceless for the entire enterprise and life-cycles.
2. ELM has an open architecture and interface with any legacy system or third party software (e.g. PLM/PDM, CAD, FEA/BEA, CFD, Explicit codes, etc.). It provides complete interoperability with and enhancements to existing Material database systems.
3. Adopters of ELM reported double digit productivity gains with increases in throughput for like simulations of 35%. Actual throughput increases were much higher as engineers are able to investigate more options in the time available to deliver Product Innovations.
4. Significant reduction in Material Lab Testing budget; almost as high as 60-70 %. High number Design of Experiments (DOE) in the digital domain helped experimental-analytical correlation /comparison efforts. Huge number of 'What-if' scenarios/design modification studies in the virtual world eventually defined optimized product performance.
5. Beyond ELM, MSC Software as so cited in the preceding page has foundational COTS that will predict the performance of exotic materials (RFT) (e.g. compressive clothing and the relative effects on bio-mechanical performance. By-products would include: reduce prototyping, improve performance, reduce testing, enhance innovation, reduce costs, shorten time to market, etc.

ABOUT MSC SOFTWARE

MSC Software is a global leader of multidiscipline simulation solutions that help companies improve quality, save time, and reduce costs associated with designing and testing manufactured products. MSC Software works with thousands of companies worldwide to develop better products faster with engineering simulation technology, software, and services. For additional information about MSC Software's products and services, please visit www.mscsoftware.com.

MSC Software's products and services are used by 900 of the top 1000 manufacturers in the world, across several industries including aerospace, defense, automotive, transportation, agricultural equipment, heavy machinery, medical devices, oil and gas, nuclear, consumer products, renewable energy, packaging, electronics, and shipbuilding.

Corporate

MSC Software Corporation
4675 MacArthur Court
Suite 900
Newport Beach, CA 92660
Telephone 714.540.8900
www.mscsoftware.com

Europe, Middle East, Africa

MSC Software GmbH
Am Moosfeld 13
81829 Munich, Germany
Telephone 49.89.21093224
Ext.495

Japan

MSC Software LTD.
Shinjuku First West 8F
23-7 Nishi Shinjuku
1-Chome, Shinjuku-Ku
Tokyo, Japan 160-0023
Telephone 81.3.6911.1200

Asia-Pacific

MSC Software (S) Pte. Ltd.
100 Beach Road
#16-05 Shaw Towers
Singapore 189702
Telephone 65.6272.0082



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