

# Showcasing Engineering Products through Micro-modeling

*Version 1*

*An Application Note Series*

## Precise Engineering

*Experts in Micro Engineering Models*

## Showcasing Engineering Products through Micro-modeling

*Learn how organizations are reducing time to market for large and complex, engineering products and structures by using Micro-modeling as a new Presentation Tool. For suppliers, buyers, employees, consultants and contractors; micro-modeling offers a very strong proposition for faster decision making by offering better visualization.*

*Now, you can also*

- ✿ *Sell and consult on your products better*
- ✿ *Showcase your complex products and Systems more effectively*
- ✿ *Speed-up design review and process reengineering*
- ✿ *Speed-up training of interns and recruits*
- ✿ *Speed-up visual training for employees on your plant/systems*
- ✿ *Resolve logistic problems in presenting large machinery and system in an exhibition center*
- ✿ *Carry replica of your large and complex products with you, any where*

# Showcasing Engineering Products through Micro-modeling

## Introduction

Micro-modeling is an engineering practice that allows representation of real life objects, however, large and complex, into smaller scale, to provide utilities that are not readily fulfilled by original objects owing to size, cost or location constraints.

More and more organizations are taking advantage of Micro-modeling technique as a novel “marketing/ selling tool” to reduce the distance between actual product/site and stakeholders that are involved in decision making through enhanced visualization. Figures 1 thru 6, show photographs of Micro-models developed for some of the complex and large engineering products.

These Micro-models are being used for following value realization:

1. Showcasing: in exhibition, marketing office, demo rooms, board room and corporate office
2. Product re-engineering: through visualization of spatially large systems during design reviews of new product development or product upgradation.
3. Instructions & Training: to recruits, employees, customers and students, about features and functionalities of products and systems.
4. Working demonstration
5. Mementos during formal occasions

Micro-models, when used for the right purpose, provide significant cost and productivity benefits to organizations in enhancing visualization of their products.

Various industry stakeholders, who are using Micro-models include product manufacturers, suppliers, consultants, contractors, design engineers, training institutes, e-learning organizations and exhibitors. Industries with profiles similar to those of ABB, BHEL, Cummins, ISRO, Sulzer, Eenner, TELCO, Bajaj, Siemens, AREVA, BEML, HMT, Crompton Greaves, Kirloskar Electric, EMCO, EIL, L&T, Caterpillar, Wartsilla Diesel, Power Grid, NTPC, NHPC, Suzlon, TERI, Reliance Energy and Tata Power will have a lot to gain by adopting miniaturized models of their products and systems.

# Showcasing Engineering Products through Micro-modeling

## Micro-modeling: a multidisciplinary engineering practice

Micro-modeling of Industrial Products is not the job of a hobbyist or a toy maker, rather, it is an exact engineering practice that involves multidisciplinary engineering approach. It needs expertise in industrial design, knowledge of assembly and precision manufacturing process, adeptness in painting, special carving and cutting process, ability in handling tiny components and special materials, and experience in structural landscaping. In making dynamic (or live) models, e.g. movement of conveyors or rotation of kiln, implementation of advanced industrial automation techniques is required. Hence normally, Micro-modeling of a structure like Power Plant, is an engineering project in itself. It takes time to produce an exact replica with the right scaling, precision and visualization.

## Micro-modeling: a new technique for enhanced visualization

Micro-modeling resolves pressing issues of engineering products and systems, that are critical for their presentation and selling. These issues are related to:

*Product Complexity:* Micro-modeling helps in bringing all the design and structural complexity in the proximity of the audience at an arms distance. Further, Micro-modeling helps in selectively highlighting particular design, contour or precision elements. Figure 1, showcases cut-section miniaturized model of Motorized Drive for off-highway vehicles from a global engineering conglomerate, that helped its team in enhanced visualization and productive engineering practices. This model is being used for enhancing product visualization of design engineers.

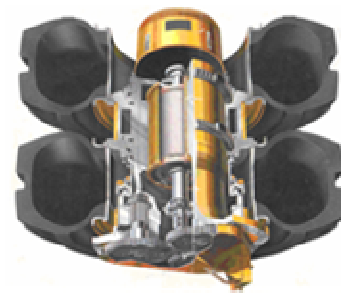


Figure 1. Micro Cut-section Model of Motorized Drive for engineering modeling and product training

*Size & weight:* Micro-modeling allows individuals to overpower the visualization limits imposed by a large product, e.g. a military tank or a megawatt range of power transformer, by reducing them over a large scale e.g. 1:200. Size of engineering products is often a big hindrance in exhibition, work study and training of the product. Recently, a global engineering leader, has ordered for a multiple number of Micro-models of a very complex product, primarily with an intention to reduce travel of its designers to site during regular training programs. A rough calculation estimates over hundreds of dollars saving for this multi-location enterprise. In product promotion, Micro-modeling, of course, provides massive benefits to organizations dealing in heavy and large machineries for whom product promotion over many location is nightmarish. Figure 2. shows Micro-modeling of 400MVA transformer that in reality stands as tall as a two storied building.



Figure 2. Micro modeling of HV transformer and shunt reactor

## Showcasing Engineering Products through Micro-modeling

*Time* : While complex products like a drive mechanism powering a process plant would take months to develop, Micro-modeling helps in quick reproduction of replicas that help the complete supply chain in understanding the product better and going ahead with various other activities concurrently, even when the product is still due for production. The products shown in Figure 2, took just a few months to build and ship to Sweden.

*Cost* : Cost of making and transporting complex products is exorbitant as it takes toll on logistics and as also these products are often made to order. Showcasing these products (even if they are dummies) is, therefore, costly. Miniaturized models of products that are, however, large and complex could be made available at a fraction of the cost of original equipments. If you deal in a large variety of products, having micro-models of these products offers you a huge leverage in showcasing your product range very cost effectively.



Fig. 3 Showcasing a range of products using a mix of Micro-models and small original products in a demonstration center

*Customer*: Before they are actually built, showcasing of large engineering products to the customer, is seldom possible. During customer interactions (selling and marketing), product promotion is often done through product brochures, engineering drawings, data sheet and product description. The only way a customer could see such products is after they have been built over several months and are already paid for; or visit another customer, who has bought a similar product. Micro-modeling makes possible an enhanced first impression on customer by allowing the miniaturized models of the products to be carried along in a box. Figure 4, shows micro model of main battle tank ready to be carried in a box to exhibition.



Figure 4: Micro Model of Main Battle Tank

## Showcasing Engineering Products through Micro-modeling

*Internal view:* The more complex a product, more involved is the internal review of product development. In internal reviews on products during new product development as well as during product re-engineering, Micro-modeling helps by offering same views to all the players in the supply chain and avoids any defects owing to non-coherent visualization of the product complexity.

*Prototyping :* Research and product development organizations pass through a series of prototyping exercises that also includes critical issues related to design patenting. Micro-modeling is actually an integral part of such an exercise series.

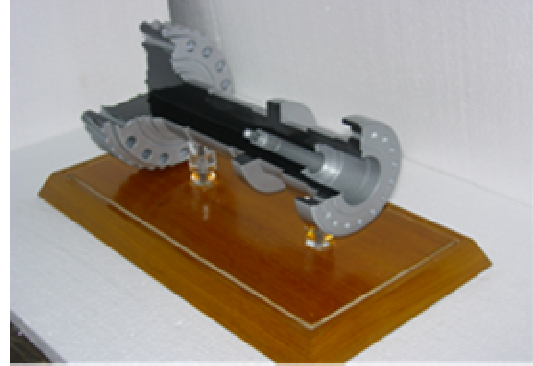


Figure 5: Micro Cut-section Model of Gas Turbine Rotor for training design and maintenance engineers

Beyond products, Micro-modeling has a very big role in structural projects that are built using a number of individual products. A switch yard, power plant or a cement mill is such an example, whose miniaturization provides enormous benefits to project team as well as the operational team. Figure 6 shows, examples of structural projects micro modeled over a large scaling factors.

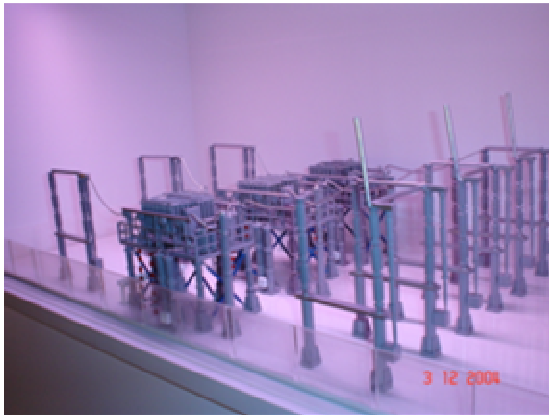


Figure 6: Micro-models of structural projects

### How to go about it?

A well planned approach is needed if you want to improve visualization process of your products. The assignment of Micro-modeling of objects is purpose specific and hence, solution based, that decides the intricacy, scale, materials and manufacturing techniques to be used. Typically these models are available in acrylic, industrial plastics and brass materials. Be prepared to provide your intent of Micro modeling, couple of engineering drawings, photographs and description of your products and systems to the model maker. Sometimes, visit of model making team to site or availability of a similar product would significantly help in catching the precision of design intricacies and ambience. You would need to be ready to have this work proceeding as if it is any other product development work and will have to follow project management principles. At appropriate schedule, you may be called to carry out inspection and approve modifications or give go ahead decision. Although, there may be many agencies offering model making services, good micro model makers of engineering products and systems are rare. You may have to hunt

# Showcasing Engineering Products through Micro-modeling

out the right agency as you would need some one, who provides a visualization solution and not just a model.

## Derive the Benefits of Micro-modeling

In a market driven economy, product organizations operate in a very competitive market. As the product lifecycle becomes shorter, organizations are targeting to speed up product development cycle by energizing the supply chain and also involving their customers earlier in the development cycle. Micro-modeling is increasingly becoming a tool to familiarize the market and other stakeholders about ones product specialty and functionalities, much before the original piece is manufactured.

So, you may be operating in any part of the product industry value chain, dealing with products, systems or projects; you now have an excellent way to carryout your discussions with your group, by having the product in front of you, before it is actually made. Further, you could ship your dream project to any destination and could have multiple copies in a very short time at a very less cost , thanks to Micro-modeling!!

## Further Information

For more information on Micro-modeling, log onto <http://www.enggmodels.com> and download following whitepapers

1. “ Micro Industrial Models- A new marketing tool ”.
2. “Showcase your Cement Plant – through Micro-modeling “
3. “Showcasing Power Industry- through Micro-modeling”

## Contact

Precise Engineering Models  
[www.enggmodels.com](http://www.enggmodels.com)  
[info@enggmodels.com](mailto:info@enggmodels.com)

Nityanand Mahale  
Manager- Business Development  
[nitya@enggmodels.com](mailto:nitya@enggmodels.com)

#247, Laggere Main Road  
Chowdeshwari Nagar, Bangalore-560 058, INDIA  
Tel: +91 98453 96473

## Showcasing Engineering Products through Micro-modeling

### **A scenario of selling complex and large engineering products in pre 21<sup>st</sup> century:**

*Martin is a veteran sales manager of an established engineering organization involved in the design, manufacturing, supply, installation and service of engineering products and systems.*

*During his career spanning over two decades, he understood that selling of engineering products that are complex and/or large in size, is all together different affair than selling of consumer goods and other non-industrial products. He laments, every time, he interacts with customers as he often feel the need for alternative sales tools beyond concepts, drawings, customer references, brochures and presentation. Never the less, to sell his engineered products, he is forced to give customers, reams after reams of information. Martin knows for sure that his products/ systems would be for a sale faster, if he could show his customers a sample product. But it is impossible for him to keep shipping these products with their weight and size, from customer to customer during the sales cycle.*

*Martin also recalls, how haywire the logistics went out last year, when his corporate office had given a go ahead to participate in the International exhibition to show case their phenomenal product range. It took almost a year for him to interact with factories to have a couple of products shipped to the exhibition, and then! the damage in handling, repairing, transportation, getting service personnel on site, installation etc; he had wondered, if he was a corporate sales manager or a site manager.*

*In fact, his team had a different sort of problem, when it was bidding for a 5 million dollar project and the customer wanted to have a feel of his products. He was confused, because these were customized products and there was no way any finished goods would exist to have the customer a look at them. He had wondered if had a set of replicas of his products, perhaps the customer would have been able to see greater details of design, giving him a vantage point to authenticate his other marketing collaterals on the special features that the product offered.*

*Thoughts were just pouring into him, as he recalled how difficult engineering department finds it to convey design features/ modifications not only to his team but also to their own team, when they conduct design reviews. Design review meetings for new product development or product up-gradation, are often full of confusion, as every body talks ones own version. All these meetings include a number of box files containing drawing sheets and a lot of explanation on board and power point slides. You sees a lot of wastage of time and effort; and also often poor communication about products and its components. In fact, he thought that most of the people are able to see their mistakes only when these products are at an advanced stage of manufacturing.*

*Martin increasingly realizes that there is definitely something wrong the way large and complex “to be products” are visualized by various people, i.e. marketing, sales, customer, engineers, production engineer, designer etc. Of course, acquaintance with product visual design is also a big issue in product training and servicing.*

*Continued...*

## Showcasing Engineering Products through Micro-modeling

### **A scenario..... in pre 21<sup>st</sup> century: continued**

*Suddenly, he becomes more aware of several instances, where various people need an enhanced visualization of these products. He is guessing if there is an alternative way to enhance visualization, then perhaps, every product and system will have dramatic improvement opportunities in its selling and production cycle, or perhaps during its life cycle. His thought process is running very fast...and he just wants to hold something...some thought...that would give him the answer. Yet something as realistic as somebody can hold, something if somebody can see close by.*

*“Micro-modeling”, yeah! He got it. How wonderful it would be if large products could be squeezed down to smaller sizes, the way they build toys e.g. aeroplanes, cars, ships etc. But he realizes that he would need these scale down models to be more precise, proportionate and meeting engineering tolerances. Often, these would need to highlight and detail intricate engineering designs .*

*Now he knows, how to have this issue of visualization of engineering products resolved and walked out searching for experts in Micro-modeling. This would be his innovation in selling large and complex engineering products.*

# Showcasing Engineering Products through Micro-modeling

## **Disclaimer:**

*CVMark Consulting is an independent niche-technology research agency based out of Bangalore. This report is commissioned by Precise Engineering Models to create market awareness of micro modeling as applied to engineering capital goods industry.*

*CVMark Consulting intends to serve business community through research reports, newsletters, issue-oriented reports and other products. No part of this publication may be reproduced, stored in a retrieval system beyond the purchaser's computer, posted on an intranet or the Internet, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the express, written permission of CVMark Consulting.*

*Factual material contained herein is obtained from sources believed to be reliable, but the publisher is not responsible for any errors or omissions contained herein. Opinions are those of CVMark and are based on research conducted for this report. CVMark holds no responsibility for decisions made on the basis of content of this report*

*CVMark Consulting  
www.Cvmark.com  
[info@cvmark.com](mailto:info@cvmark.com)  
Bangalore*

CVM-MM-004-001