Electrocoating Software

BEASY predicts how effective an Electrocoating process is at providing the required paint thickness without the need for pilot studies or full scale tests. With the software you can create a virtual prototype of the process and optimise the parameters to achieve the required film build.

- Reduce prototyping costs
- Improve product quality and reduce risk
- Use as an upfront design tool to optimise corrosion and structural integrity
- Predict the paint film thickness
- Ensure coating in recessed areas
- Optimise anode cell placement and line speed
- Predict paint usage for different process conditions

Unique Experience

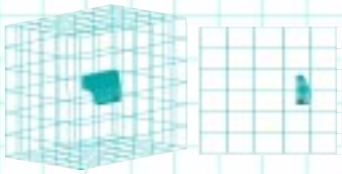
The BEASY team bring together over twenty years experience in electrochemical modelling and practical experience in paint coating technology. Therefore we can provide not only modelling tools but also expert advice on their application to bring real world business benefits.

Predict Paint Thickness

The model simulates the electrochemical process and the electric fields to enable the film thickness to be predicted. Based on easily performed experimental tests to obtain the paint characteristics, the voltage and the current fields can be predicted which determine the paint film thickness.

Reduce Prototyping Costs

Testing on a virtual process is much less costly and safer than a real one. The paint, process design and product design can be optimised using the computer model as the impact of changes can be predicted very quickly and easily. In the case of assessing the coating of a vehicle the savings of one prototype can pay for the investment in the modelling many times over.



Optimise Anode Cell Placement and Line Speed

Create a virtual model of your bath to optimise the process parameters.

Save Paint

Use the model to determine the minimum paint usage to achieve the target paint thickness.

Computer Requirements:
Windows NT, 2000, XP or Unix Workstation.

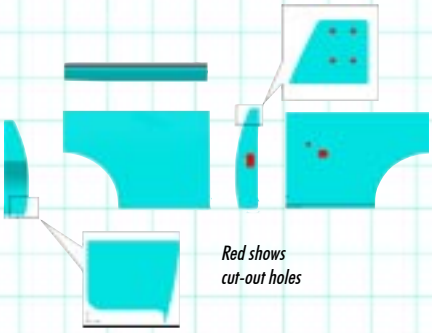
BEASY is compatible with existing modelling tools such as PATRAN and IDEAS.

Windows users can also use BEASY's own modelling tools.

Ensure Coating in Recessed Areas

One of the most difficult tasks is to ensure that adequate coating is achieved in recessed or difficult to reach areas. Modelling provides the answer to this problem by predicting the paint thickness even with very complex geometric parts.

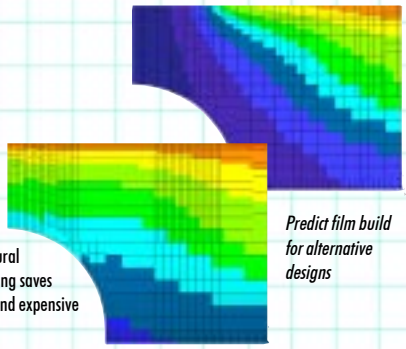
Simply change the process parameters or even the design of the part itself and see the results.



Red shows cut-out holes

Upfront Design Tool

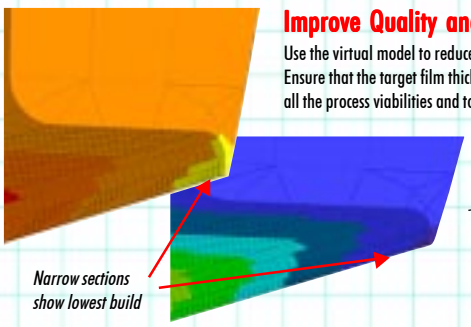
Avoid last minute changes to your product to enable adequate coating of difficult to reach areas. Create a model as part of your product design process to enable the corrosion integrity to be assured without compromising the structural integrity. Informed upfront decision making saves money by reducing last minute changes and expensive prototypes.



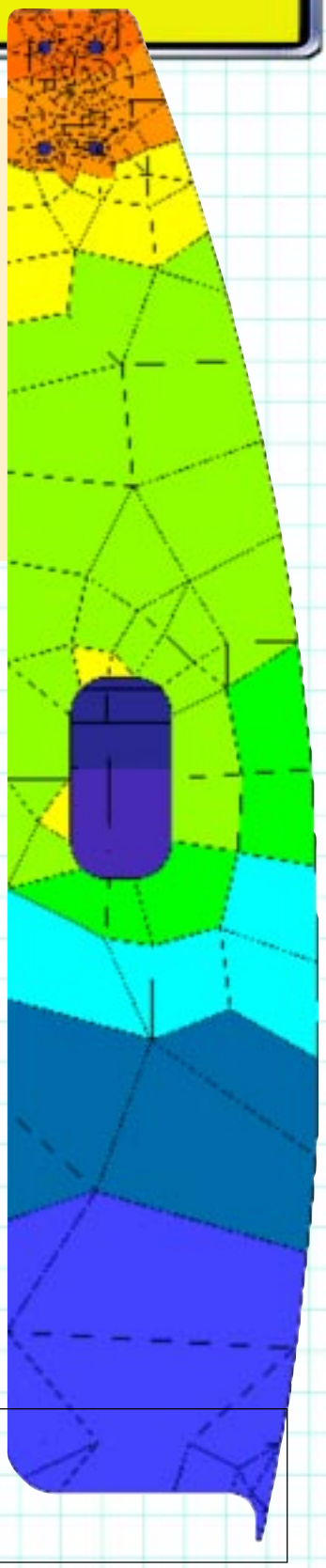
Predict film build for alternative designs

Improve Quality and Reduce Risk

Use the virtual model to reduce the risks in the process. Ensure that the target film thickness is achieved under all the process viabilities and tolerances.



Narrow sections show lowest build



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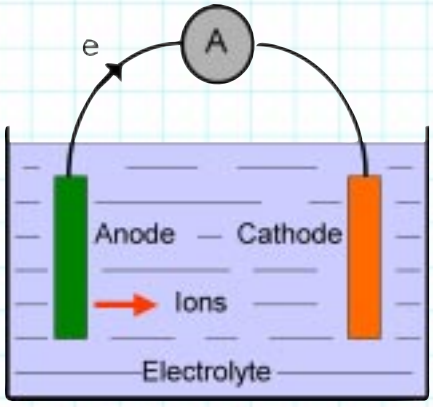
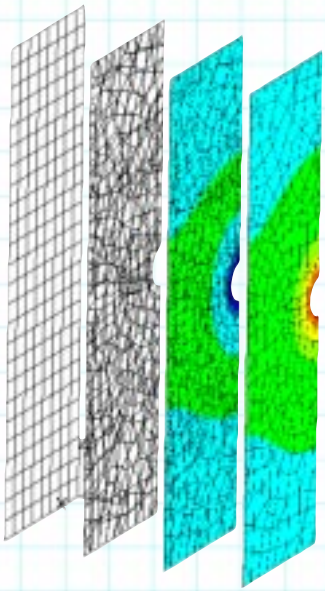
How Does it Work?

An Electrocoating system is basically a galvanic cell where the part to be coated is the cathode. The bath contains the electrolyte and the electrodes in the bath act as anodes.

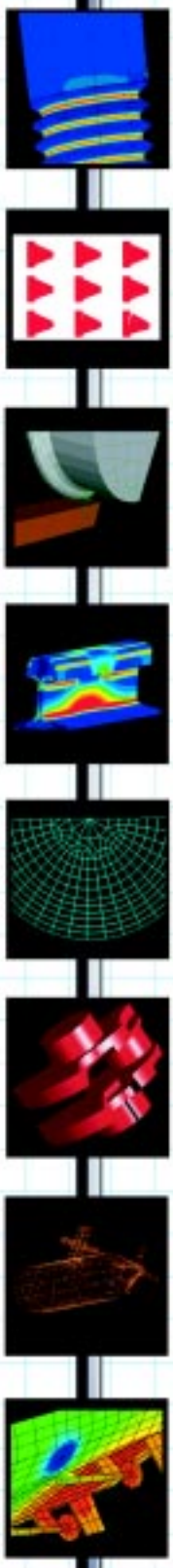


Applying a potential difference between the anodes and the cathode causes current to flow which deposits paint on the surface. As the thickness of the paint increases the electrical resistance increases thus causing the current in the bath to flow to different areas of the cathode.



The computer model uses a numerical method called the boundary element method (BEM) to model the bath (electrolyte) and the electric potentials and current flow. As the BEM only requires the boundary to be modelled this substantially simplifies the model construction tasks. Other techniques such as the finite element method have been applied to this type of problem but they substantially complicate the model building tasks.

The electrochemistry on the anode and cathode surfaces and the paint build are the other key elements in the model. This data is obtained from simple experimental tests.



What Data is Required to Build a Virtual Prototype of my System?

The data required to build a Virtual Prototype of my System is:

- The geometry of the part to be coated. This can be constructed or more conveniently imported from a CAD system. The BEASY software has its own modelling tools which can be used to construct the geometry of the part or interfaces are available for IDEAS and MSC Patran.
- Existing crash test data may be suitable for use in electrocoat simulation
- The geometry of the bath and the location of the electrodes
- Bath conductivity
- The paint characteristics. This data can be obtained from experimental tests or may be already available from the paint supplier.

Results from the Model:

The model provides the film thickness of the paint.

This is normally viewed on a three dimensional virtual prototype of the painted part where colours are used to indicate paint thickness.

Capabilities of the BEASY Electrocoat software:

- Direct analysis
- Full 3d/2d/axisymmetric models of complex geometric parts
- Multiple anodes
- Real anode and bath geometry
- Provides total paint usage
- Power consumption prediction
- Predict power loss in anode membrane
- Transient analysis

Design:

- Investigate effects of different access hole layouts
- Investigate effects of changing anode number, size, and position
- Investigate the effects of changing process parameters and paint properties

What the BEASY Electrocoat Team can offer:

- Solutions for your one-off design problems
- Diagnosis of practical operating problems
- Software licenses so you can include electrocoat design in your design cycle
- Training in use of BEASY Electrocoat software

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