



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Welcome to Goss Innovations



Goss Innovations is a mechanical engineering design consultancy. Founded in 2000, and based in Devon in the UK, Goss Innovations is owned and run by husband and wife team Richard and Lesley Goss. We have gathered a highly skilled team of engineers with a broad range of experience, allowing us to work in many fields, including automotive, aerospace, construction equipment, marine, and special purpose machinery. The company has invested in the latest IT technology allowing us to work with clients all over Europe.

Our mission is to assist our clients in the areas of product design, modelling, manufacturing solutions, engineering analysis, tool design, reverse engineering, CAD application development and implementation, Product Data Management, and Legacy Data Conversion, covering the entire product lifecycle. The emphasis of our work is product improvement and cost reduction. Goss Innovations offers an innovative yet practical engineering design service.

Archive

BBC Spot light Goss Innovations interviewed.

Western Morning News

Western Morning News
November 18 2003
page 23



Radio Devon
interview

Events

The SOLID Applications **Solid Edge V16** Launch Conference that takes place at The Heritage Motor Centre, Gaydon, Warwickshire.

Thursday 7th October 2004 and 12th October 2004
Goss Innovations will give a presentation.

Hercules

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HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

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UGS
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HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Services

Goss Innovations offers a wide range of engineering design related services, including product design, modelling, manufacturing solutions, engineering analysis, tool design, reverse engineering, CAD application development and implementation, Product Data Management, and Legacy Data Conversion, covering the entire product lifecycle. We aim to provide a flexible efficient service tailored to our individual clients requirements.



CAD

The entire product design process from concept right through development to finished production standard drawings ready for issue. [more](#)



DESIGN

Engineering Design is the core of our business. We strive for elegant cost effective solutions that pay attention to every detail, and every process. Good design is crucial; after all, 80% of a products cost is locked in at the design stage! [more](#)



ANALYSIS/CAE

Computer aided engineering and Finite Element analysis provide powerful tools for optimising product designs with particular emphasis on strength and durability. [more](#)



CASTINGS & FORGINGS

One well designed casting or forging can replace several parts in an assembly. In the right place, a casting can look great, work well, and be cost-effective. [more](#)



PROTOTYPES

Prototyping forms a vital part of developing a new product. Goss Innovations can organize the building and testing of prototypes, from early concepts and mock-ups through to pre-production models. [more](#)



HYDRAULIC CIRCUITS

Hydraulics provide a very compact way of delivering power to where you need it. An efficient, well-designed circuit is key to a reliable, cost effective solution. [more](#)



REVERSE ENGINEERING

Goss Innovations operates a photogrammetric modelling system, which builds 3D models from photographs. This makes it suitable for any size of project from components through to buildings. [more](#)



MECHANISMS

Mechanisms are at the core of many of our design solutions. Since the invention of the wheel, mankind has been fascinated by clever mechanisms, perhaps because so many physical and engineering principals need to be exploited with imagination and ingenuity. [more](#)



WELDED STRUCTURES

The design of highly stressed welded structures is a specialist area where Goss Innovations is particularly strong. [more](#)

[home](#) | [services](#) | [resources](#) | [contact](#) | [cad](#) | [analysis](#) | [design](#) | [welded structures](#) | [castings & forgings](#)
[hydraulic circuits](#) | [mechanisms](#) | [prototypes](#) | [reverse engineering](#) | [resources](#) | [portfolio](#) | [contact](#)



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Resources

Goss Innovations is equipped with;

Unigraphics / NX 3D Modelling package

Solid Edge 3D Modelling package

ANSYS FEA package

Ancillary software - We also run a variety of other software both to enable us to deal with a variety of file formats, and to be able to present reports and data to a professional standard.

Hardware - Our CAD software is running on PC based workstations in a Windows environment. We use both desktops and workstation class laptops so that it is easy to go to a customer site and hit the ground running. Space Mouse as standard.

Internet connection - Land based broad band internet connection. (Secure network with two firewalls).

VPN -technology to interact live with your network or PDM system.

Secure FTP - facility for exchange of data with clients. Each client can be provided with a login and password to their own area of our FTP site.

Prototypes - We can arrange for prototypes to be produced in a local engineering company with whom we have built a close working relationship.



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Portfolio



Dunlop Aviation - A world leader in the manufacture of aircraft wheels and braking systems. Our involvement over a period of time has been with the design of a new aircraft braking system. We have assisted in a knowledge based engineering project to help streamline the design process within the company.

VOLVO

Volvo Construction Equipment France - Volvo manufacture a large range of construction equipment from small mini-excavators to huge dump trucks.

We have worked over the past two and a half years in conjunction with their design team on their new backhoe loader range. Responsibilities allocated to us included the redesign of the slew system. Hydraulic cab controls (patent applied for) and new front loader automatic hitch.



Vehicle Trim Technology (formerly T.Mat Engineering Ltd) – Probably the major supplier of floor mats and interior cab trim to off road vehicle manufacturers.

We provide a reverse engineering service to capture the hand crafted prototype models in CAD.

Hercules

Hercules Engineering Ltd - A general engineering and prototype company who also manufacture a range of bow-thruster units for ships. We provide 3D modeling capability as required, which has included a detailed design of a large domestic staircase in stainless steel and wood. This was then able to be manufactured remotely and fitted without the need for site modification.



Liquid Cargo Management - A specialist company providing a petro-chemical clean-up service.

They required design input from us for a revolutionary new machine for cleaning forecourt petrol tanks (patent applied for).



Parragon Mann Design – A leader in innovative boat design.

We have produced prototype modifications and production drawings.

Harrison Sutton – A leading architectural practice in the South Hams.

In this instance photogrammetry software was combined with UG to produce 3D models of buildings.



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[home](#) | [services](#) | [resources](#) | [contact](#) | [cad](#) | [analysis](#) | [design](#) | [welded structures](#) | [castings & forgings](#)
[hydraulic circuits](#) | [mechanisms](#) | [prototypes](#) | [reverse engineering](#) | [resources](#) | [portfolio](#) | [contact](#)



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Contact Details

Our office is situated in the Elizabethan market town of Totnes, South Devon. Close to the M5 and six miles off the A38. Plymouth and Exeter are both twenty two miles from Totnes. There is an airport at Plymouth with frequent flights from Gatwick and a main line station in Totnes running a direct service from Paddington.

We would be delighted to arrange a visit to your site to discuss your possible requirements, or if you prefer, please call in to our office.

If you would like any further information, please contact either [Lesley](#) or [Richard Goss](#).



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HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

CAD



The entire product design process from concept right through development to finished production standard drawings ready for issue. We can work from existing or legacy 2D drawings, even "back of the envelope" sketches. All our modelling is 3D and parametric. Assemblies can be built and analysed for fit and function, cost, ease of assembly etc, all based around the CAD system's automatic bill of materials generation. Drawings can be done to customer's own specification using customer's drawing borders etc. We have broadband and VPN facilities, which allows us to interact directly with client's networks if needed. This is particularly useful where data is managed by a PDM database system such as Teamcenter as there is no longer the requirement to extract a work package of files from the system and then later have to upload the completed work. We are familiar with Teamcenter and Smarteam and are currently using Teamcenter via VPN links.



For Unigraphics and Solid Edge we can offer customisation of a client's CAD system to make its use much more efficient. Examples would be company standard drawing borders automatically filled in, 3D models checked for company standards, standard part libraries, parametric template models that can be driven by grip programs (Unigraphics). These are the first steps towards "knowledge based engineering" which aims to capture as much as possible of a companies expertise within it's CAD system so that all staff within the company can have effective access to it. In many companies a lot can be done to improve CAD use without having to spend more on the CAD system itself.



HOME

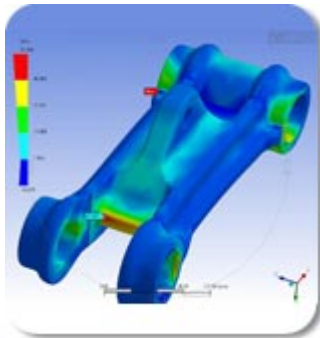
SERVICES

RESOURCES

PORTFOLIO

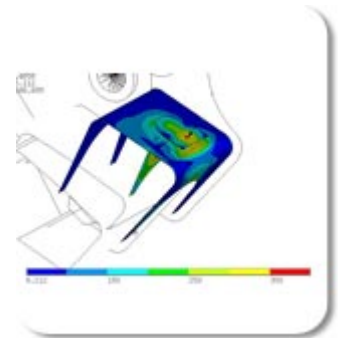
CONTACT

Analysis/CAE



Finite element analysis is a powerful design tool. Models are built directly from CAD data and analysed to provide estimations of stress strain and deflection under various kinds of loading. Work is carried out using Ansys. These results can be interpreted to give fatigue life predictions of both components and assemblies. We have a lot of experience using these analysis techniques for design optimisation of highly stressed welded assemblies, leading to cost effective, structurally efficient products.

Kinematic analysis is used for studying mechanisms, looking at the movement of each part with particular attention to interferences and loads generated for all critical positions and load cases. Thermal analysis, harmonic analysis, acoustic analysis, and computational fluid dynamics, are all further techniques that are available to our clients.





HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Design



We aim to provide mechanical engineering solutions to a wide variety of problems. Cost of manufacture should be minimised without compromising the performance of the product. A detailed understanding of the client's problem is crucial to the building of an effective design specification.

The skills to utilize the latest design tools effectively are pre-requisite to both achieving the best solution as quickly as possible, and to communicating the ideas behind that solution in the most effective way. Everyone involved needs to fully understand what is being proposed and why.

Enthusiasm, talent, and a belief that almost anything can be improved, helps to drive our team to try to always produce innovative ideas. We pride ourselves that more than one client has been able to apply for patents as a result of our work. We also like to work in the real world where cost is very important. We are used to providing cost breakdowns of all the components, as well as the cost of assembling the parts. Some areas where we feel we are particularly strong are the design of **welded structures**, **castings and forgings**, **mechanisms** and **hydraulic circuits**.





HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Welded Structures



Long experience in the design of off road vehicles has led to a high level of expertise in the design of highly stressed welded structures. In order to get the best results, a very deep understanding of all the clients' requirements must be reached from which a full design specification can be constructed. Using finite element stress analysis techniques to feed directly into the design process we are able to optimise the use of material leading to structurally efficient designs.

The lowest possible cost of manufacture is essential for successful products. The solution to this problem is multi layered and includes specifying the right material, choosing the best processes, minimising the number of parts, and minimising the number of operations required both in producing the piece parts and in welding and machining the assembly. This can also lead to designing the jigs and fixtures, and

working closely with the proposed manufacturer so that the design is most easily produced using the available facilities. We have experience of working with suppliers from all over Europe, and are often able to suggest possible suppliers for clients who may wish to sub-contract the manufacture of all or part of their product.

Cost breakdowns can be carried out which allow all of these factors and the ways in which they interrelate to be studied. We are familiar with working to both British and Swedish weld classification standards for predicting the fatigue life of welded structures. Often quite small changes in the detail design of piece parts can alter the weld class of a joint dramatically improving its fatigue life.



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Castings & Forgings



Design and modelling of castings in most materials can be offered. We have experience of large spheroidal graphite (SG) iron castings used in highly loaded environments often where the casting is being used to replace a fabrication for cost reasons.

Cast steel is another material used in a similar fashion and can be incorporated into welded assemblies. More specialist materials have also been worked with including aluminium, and titanium. We have dealt with foundries all over Europe and further a field.



Turkey, China, and the Eastern European countries are now often the source of castings owing to cost. We are used to modelling with draft angles and split lines making the use a rapid prototyping very easy, and we are able to provide models in a variety of formats to suit these processes.



HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Hydraulic Circuits



Hydraulic circuit design experience has mainly come from the design of specialist off road vehicles. We are familiar with all the main types of pump and are used to designing for transmission systems as well actuators and mechanisms designed to be hydraulically powered.

Oil quality issues form another important facet of designing circuits. Correct specification of filters and tanks as well as the storage and handling of components is crucial to achieving maximum life and reliability from the overall system.

Calculations to model the performance of hydraulic systems are used to predict the efficiency and peak performance to be expected from any particular design. These calculations also look at the heat generated by the circuit during its working cycle allowing the correct specification of coolers if required. Cooling can be a very major consideration in a lot of off road vehicles where there is often a requirement for high power systems to be packaged into a very small space. We have also built up a close working relationship with a company who are able to source and assemble the parts for production or testing.



[HOME](#)

[SERVICES](#)

[RESOURCES](#)

[PORTFOLIO](#)

[CONTACT](#)

Mechanisms



Mechanisms form the basis of many of our design solutions. The ability to simulate designs using CAD and other software is key to optimising a design's performance. The CAD model can be animated to check for interferences and clearances. The model can also be used to provide input data to study the loads in all the components to ensure reliable operation of the mechanism.

Mathematical models can be built which allow the effects of variations to the design to be swiftly and accurately assessed. This is often done in a spreadsheet, which in some cases means the mathematical model can be used to directly drive the CAD model allowing the best appreciation of the

problem being solved. All of the above is based on a thorough understanding of the client's requirements, which are then translated into a performance specification for the mechanism.

Kinematics software packages can also be used if needed which can take into account inertia loads generated by the components of mechanism itself, although this level of sophistication is not always required. We do not analyse for the sake of it but only to help get to the best solution we can offer.





[HOME](#)

[SERVICES](#)

[RESOURCES](#)

[PORTFOLIO](#)

[CONTACT](#)

Prototypes



Prototyping forms a vital part of developing a new product, and Goss Innovations has developed a close working relationship with an engineering company specialising in the manufacture of one off projects and prototypes.

This give us access to first class facilities for high quality machining and fabrication work. Hydraulics and electronic controls can be added as needed. As a result we can offer an unparalleled service to our clients who require prototypes be built and tested.

Projects are closely monitored to give the client good feedback on progress and projects are done to agreed costs and timescales. An added benefit of offering this service is that our team design in the "real world" and are not closeted in a designer's ivory tower. We feel that this is quite an important benefit, even to those clients who do not require any prototyping.





HOME

SERVICES

RESOURCES

PORTFOLIO

CONTACT

Reverse Engineering



Goss Innovations operates a photogrammetric modelling system. Photogrammetry is basically the science of taking measurements from photographs. Our system has proved useful for helping to create CAD models of components that have already been created, and has also been useful in taking 3D measurements in situations where access is difficult.

Architects have been able to make use of the system for surveying buildings, and we are able to create CAD models from which accurate dimensions can be taken. The system is also able to remove perspective from a photograph making it geometrically correct in 2D. This allows the photograph to be used directly on a drawing board, or used in creating layouts to show street frontages etc.

