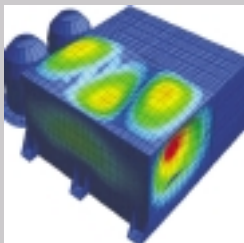




LEGACY DATA CONVERSION



REVERSE ENGINEERING



FROM **CONCEPT** TO **CUSTOMER**



FINITE ELEMENT ANALYSIS

DISTANCE ENGINEERING

changepond

CHANGEPOND TECHNOLOGIES  
**MECHANICAL ENGINEERING SERVICES**

## FROM CONCEPT TO CUSTOMER



### We believe...

Changepond is a Technology intensive Solutions and Services company. We develop and deliver Software and Engineering Solutions & Services to our Enterprise Clients. We work relentlessly to earn total Trust. We measure our business success with the trust we earn and accumulate with our customers.

### We understand...

Today the manufacturing sector especially the Engineering Industry faces increasing challenges to survive and compete in the rapidly changing market compulsions like:

- Drastic shrink in products life span
- Rapid introduction of new products
- Increased product complexities
- Build to order compulsions
- Substantial reduction in time to market
- Newer methods of selling and servicing
- Division of competencies
- Large scale outsourcing
- Revolutionary supply chain practices

Agility, Speed and Costs are the most critical success parameters of the manufacturing business. Traditional manufacturing practices are being constantly and critically looked into; to introduce innovations and improve competitiveness. The boundaries of manufacturing enterprises are getting extended or rather removed in favor of Concurrent Manufacturing and Distance Engineering Practices to satisfy the time to market compulsions. Rapid advances in communication technologies are eliminating the physical distance barriers. Virtual Manufacturing is becoming a reality.

Successful manufacturing enterprises have started recognizing that the division of competencies increases innovation, effectiveness and speed. This is further being extended to large-scale outsourcing to exploit the inherent geography specific advantages related to capacity, skills, costs etc. Smart Outsourcing is the order of the day in manufacturing.

Changepond understands very well the Engineering Industry compulsions and realities and is uniquely positioned to help our clients with a wide range of specialized outsourced services from concept to customer realization. We offer technology & knowledge intensive deliverables with substantial cost benefits. We are in the business of Distance Engineering; providing instantaneous engineering office capacity and high quality deliverables to our clients at the lowest costs.

### We deliver...

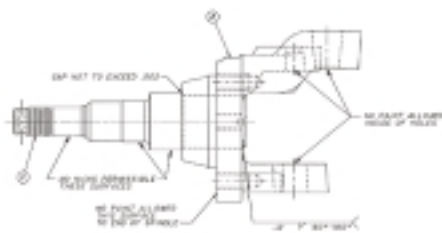
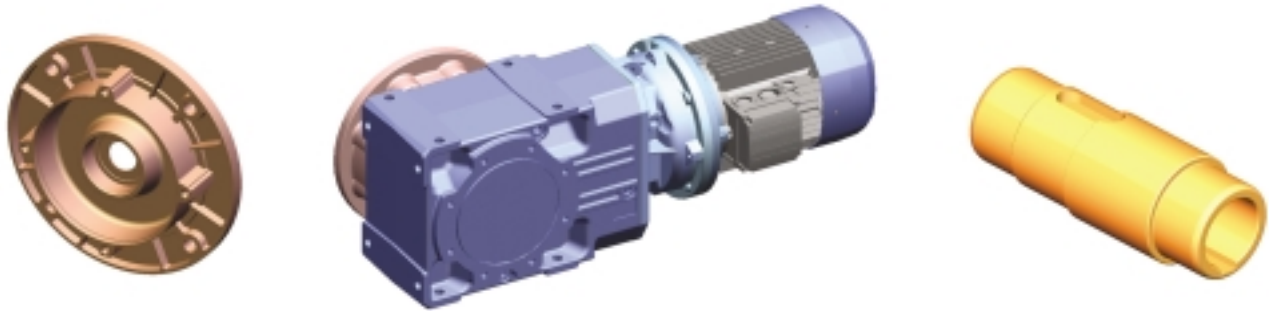
Changepond offers a wide range of Mechanical Engineering Services and Solutions from Conceptual Design to shop floor related services. We have deep knowledge and experience in providing high precision & high quality services related to Legacy Data Conversion & Migration, Finite Element Analysis, Reverse Engineering and a whole lot of Distance Engineering Services covering Conceptual Product Design, Rapid Prototyping, Mold Design, Tool Design, Special Purpose Machine Design, Product Data Management, Computer Aided Manufacturing, Design for Manufacturing and Assembly (DFMA), GIS Services etc.

## Legacy Data Conversion & Migration services

Changepond has vast experience in Legacy Data Conversion, Associated Technologies and Processes. Our proven methodologies are specifically designed to provide dependable conversions to our distant clients. Changepond provides the best value-for-money Legacy Data Conversion services.

Our focus parameters are time, productivity, quality and costs. Data quality and consistency are our watchword. We develop and use client specific reusable models to increase productivity and reliability. We help our clients to focus on their critical core design tasks and entrust the conversion / migration assignments to Changepond.

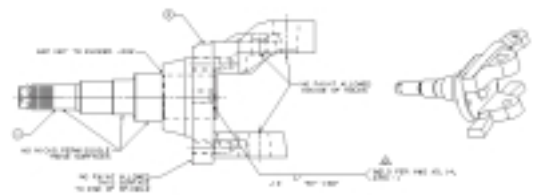
With our top of the line engineering talent, we deploy proven methods of conversion under secure data environments. Changepond has perfected the conversion / migration processes to deliver one hundred percent quality from paper through 3D Model, from manual and raster to vector conversions. We have experience in complex assemblies involving several hundreds of components. We have deep expertise in feature based solid modeling.



Manual Drawing - Customer Input



3D Solid Model



Parametric 2D Drawing

We offer complete range of conversions from one form to another covering paper document to CAD as well as CAD to CAD with various readily available inputs like Legacy documents / Raster drawings / 2D drawings / 3D models / other client specific options including Image plus hidden text PDF / Image only PDF / Normal PDF / Word and Excel documents etc.

We deliver the output in various standard digital formats as required by the client such as: UG models / Pro-E models / IDEAS models / IGES / STEP / DXF/DWG / Rapid Proto type / CATIA models / AutoCAD drawings / SGML / XML etc.

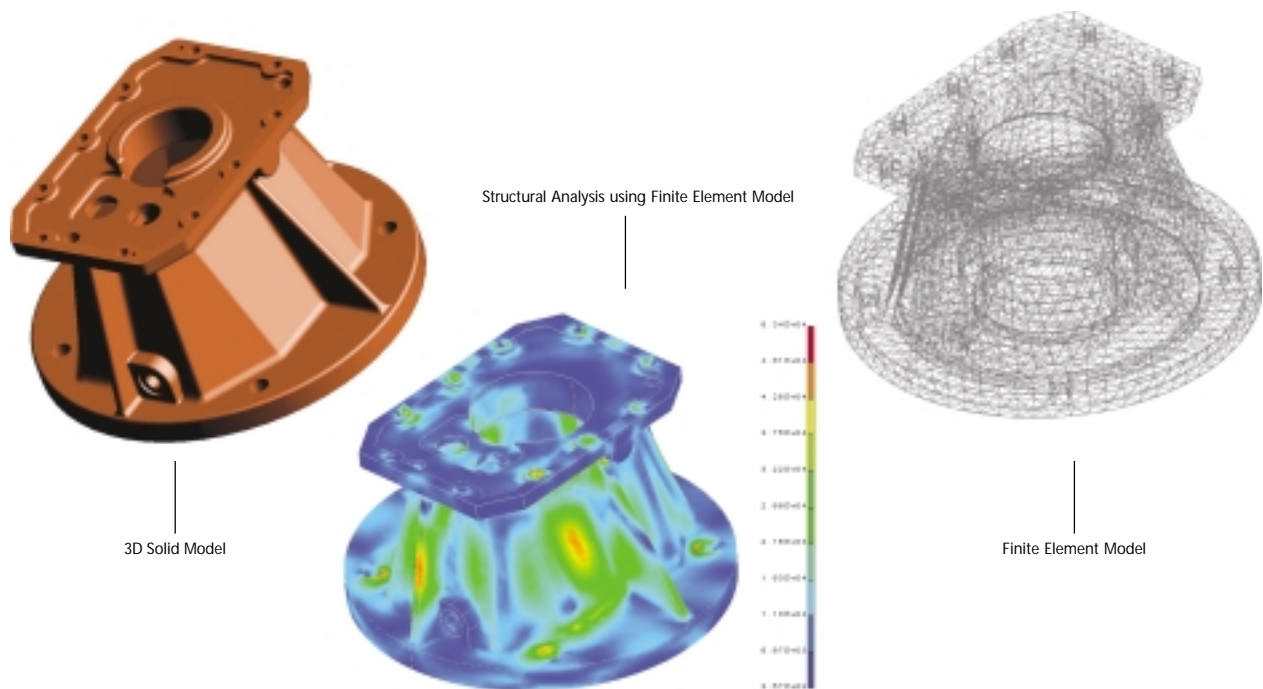
Changepond is equipped to handle very large conversion volumes with speed and accuracy under various software environments. Changepond lays emphasis on continuous improvement in conversion methods and processes so as to provide the highest quality and timely deliverables at the lowest possible costs to our clients.

Changepond Engineers have deep working knowledge and proficiency in the leading industry CAD software systems and their latest versions: Unigraphics®, Pro/Engineer®, IDEAS®, CATIA®, SolidWorks® and AutoCAD®.

## Finite Element Analysis Services & Solutions

Finite Element Analysis (FEA) is an universal method of simulating the behavior of a physical part or assembly by building a geometric model of the part, dividing it up into numerous connected elements, applying loads and constraints to find out various possibilities of failures due to variety of reasons like deflections, fatigue, stresses etc. Finite element analysis is a very powerful tool to design and redesign failure proof and predictable behavior components and systems.

Changepond FEA specialists have extensive experience in Modeling and Analysis of complex components, assemblies and engineering systems. We provide our clients complete range of FEA services including Failure Cause Analysis, Improved Solutions through Redesign and Optimization. Simulation of real-life situations, Design Validations, Redesign, Design Optimization, Correlation between Test & Analysis Data, Service Life Prediction, Kinematics Analysis and Failure Mode Prediction are performed by our highly-qualified Engineers with multi-faceted experience.



Changepond has deep experience in whole range of finite element analysis techniques to provide total solutions. Our engineers follow a well-developed methodology and systematic approach in carrying out the Finite Element Analysis leading to the most practical solutions.

Our typical Finite Element Analysis process steps are:

- Build Parametric Model
- Create Finite Element Model
- Apply Loads & Boundary Conditions including Contacts between parts in an assembly/ systems
- Define Material Properties, Linear and Non-Linear etc.
- Subject the model to determine stresses and deflections
- Analyze & interpret the results for possible failures
- Redesign and Optimization based on results and requirements
- Documentation of results in the desired formats with various levels of detail

Changepond has deep working experience with the leading FEA software tools: ANSYS®, ABAQUS®, HYPERMESH®, ICEM-CFD®, IDEAS®, PATRAN®, NASTRAN®, COSMOS and ADAMS®.

## Reverse Engineering Services

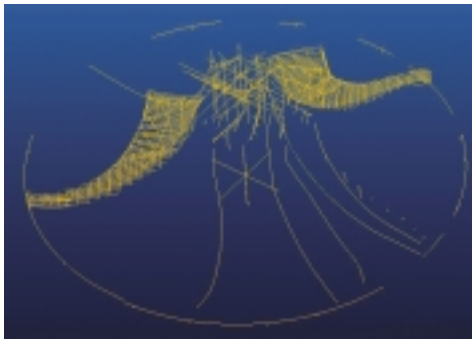
In real life situations many a times proper CAD models and data do not exist for the machines and parts that are under use / production. It is also not an uncommon situation to have substantial gaps between the existing CAD models and the current usage / production designs.

The non-availability or inadequate CAD models are due to a variety of historic reasons like:

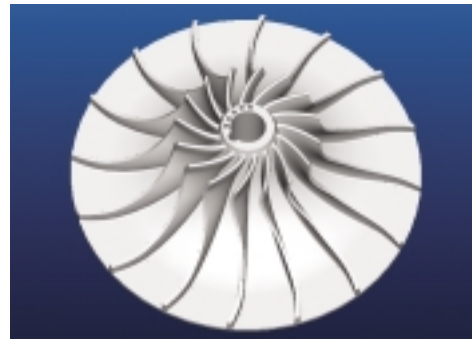
- CAD systems were not used in the original designs
- Change of suppliers and OEM vendors
- Incremental shop-floor driven design changes
- Poor Product Data Management
- Database disasters etc.

Reverse Engineering (RE) is a well-developed engineering practice for duplicating an item functionally and dimensionally where there is no CAD model exists. These processes include physical examination, measurements by various techniques, application of knowledge and experience to arrive at physical dimensions, attainable tolerances and material characteristics of an item for production / procurement. Also reverse engineering is viewed as a proven time-compression methodology for the development of any product variance.

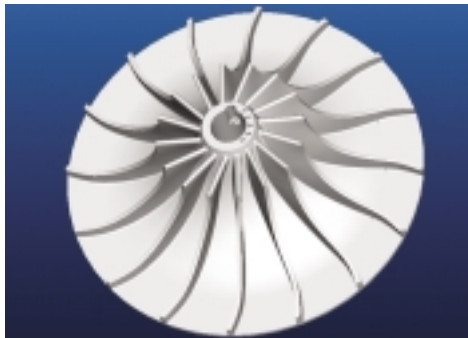
Changepond Reverse Engineering Services are based on our vast experience, accumulated knowledge base and well-proven techniques. We have deep experience in every process step of reverse engineering by handling complex and unique RE challenges.



Scanned cloud data of a deformed Impeller



3D view of deformed Impeller



Modified Impeller - Reverse Engineered

- Use of various measurement techniques including CMM, Laser Scanning etc. to map the surface data of any part, regardless of surface complexity
- Creation of cloud data to generate 3-D curves for constructing a parametric solid model using different techniques and software environments
- Use of Computer Aided Verification (CAV) techniques to verify part accuracy of the parametric solid models using data analysis, comparison and inspection

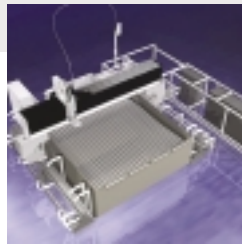
Changepond provides total reverse engineering solutions to our clients with our deep knowledge and experience in the engineering design philosophies and processes like Design recovery, Forward engineering, Re-engineering, Tolerance development etc.

## Changepond Distance Engineering Services

Changepond provides a wide range of cost effective & knowledge intensive engineering services from conceptual design to manufacturability related shop-floor services. Our Mechanical Engineering Services engineers have vast industry experience and deep knowledge and skills in handling large complex customer projects. Our distance engineering capabilities are aimed to offer greater flexibility and tremendous cost benefits for our clients located anywhere in the world. We follow well-proven outsourcing models and processes to offer high quality timely deliverables. Our goal is to be the most trusted, high quality and cost effective Distance Engineering Outsourcing Partner to our global clients.

Our services include:

- **Conceptual Product Design**
- **Rapid Prototyping**
- **Mold Design**
- **Tool Design**
- **Special Purpose Machine Design**
- **Product Data Management**
- **Computer Aided Manufacturing**
- **Design for Manufacturing and Assembly (DFMA)**
- **GIS Services**



WE WORK RELENTLESSLY TO EARN TOTAL **TRUST**

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Changepond's Enterprise Software Solutions & Services business focuses on **Application Software Development, Application Software Enhancement & Maintenance, Enterprise Application Integration (EAI), Business Intelligence (BI), ERP Services and Pre-Built Solutions.**



Changepond's business geography covers Asia, Europe and North America. We have a state-of-the-art Technology & Development Center in Chennai, India housing over 200 Engineers. We are also developing 14 acres of land in the Information Technology corridor of Chennai, India to build dedicated state-of-the-art facilities for various business practices. Changepond is backed by a strong management team of well-accomplished professionals with diverse industry background.

WE MEASURE OUR BUSINESS SUCCESS WITH THE TRUST WE EARN AND ACCUMULATE WITH OUR CUSTOMERS



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