

Knowledge, Rules and Reality

Leveraging Intellectual Capital to Deliver Capital Projects



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Knowledge Management at Fluor

Connecting People
Delivering Value

2008

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Topics

- ◆ **Fluor Corporation**
- ◆ **Knowledge Management**
- ◆ **Rule-based Design**
- ◆ **Convergence**
- ◆ **Key Success Factors**



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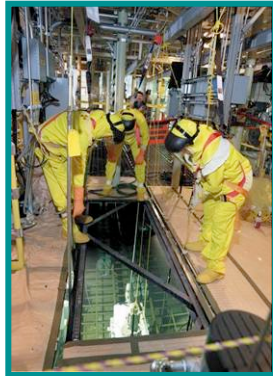
One of the world's largest publicly traded engineering, procurement, construction, maintenance and project management companies.

Energy & Chemicals



Dow Chemical & Petrochemical Industries Company (PIC)
Shuwaiba, Kuwait

Government



Project Hanford Management Contract
Richland, Washington

Industrial & Infrastructure



High Speed Rail
The Netherlands

Global Services



Nexen – Long Lake Project
Alberta, Canada

Power



E.ON U.S.
Ghent, Kentucky

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Business Environment

- ◆ Global project execution
- ◆ Multi-party project execution
- ◆ Workforce scarcity and mobility
- ◆ Supply chain integration and collaboration
- ◆ Business cycles
- ◆ Aging workforce
- ◆ Rapid growth
- ◆ Record backlog

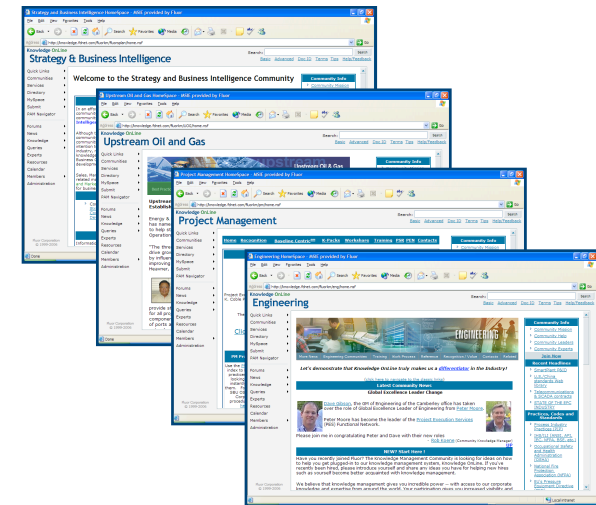


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Enterprise-wide Knowledge Management

- ◆ **One vision and one solution for the enterprise**
 - Communities with integrated content, discussions, profiles
 - Requires enterprise thinking and a global mindset
- ◆ **Achieve business objectives**
 - Leverage the collective intellectual capital of all employees
- ◆ **Provide optimal solutions to customers**
 - Knowledge is shared across boundaries
 - Search across all communities
 - Anyone can ask a question anywhere
- ◆ **Enhance skill sets of employees**
- ◆ **Global accessibility of knowledge**
 - Requires a robust technology solution
- ◆ **Intellectual property protection**



Knowledge OnLineSM

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Enterprise-wide KM Statistics

Time and again we surprise our clients with what is truly global reach

- ◆ **44 knowledge communities**
- ◆ **More than 28,000 active members dispersed globally**
- ◆ **2008 activity through August**



Knowledge Read	Knowledge Download	Forum Submit	Forum Read
1,608,000	67,300	9,700	378,000

External KM Recognition

"Maximizing the value of the company's enterprise intellectual capital"

"Excellence in retaining today's knowledge for tomorrow's workforce"



2007 - Global Winner
2007 - North American Winner
2006 - Global Winner
2006 - North American Winner
2005 - North American Winner

"Excellence in using communities of practice"



"True revolutionary"



"Greatest business impact"

As the business process of knowledge management matures, more and more KM practitioners are recognizing that the approach used by Fluor (and only a few other organizations) leads to improved and sustained business performance.

***Connecting People, Inside Knowledge Magazine,
Jerry Ash, June 2007***

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Internal Resources to the Rescue

Problem reported to software vendor

- Vendor's support team could not resolve
- **26 emails** over month and a half

Finally, I submitted the problem to our discussion forum

Response from New Delhi office the following morning with the solution

Changed our problem resolution process to submit to Knowledge OnLine first



Rex Ray
Greenville, SC

Time spent working with the software vendor on problem resolution
= 25 working days with no results

Time to resolve using the discussion forums
= 1 working day with instant results

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One Company's Junk is Another's Treasure



Ian Gibson
Melbourne, Australia

One of Fluor clients was trying to stretch their 30-year-old control system for another 15-year service.

The company that manufactured the system is no longer in business, and getting old cards repaired is extremely difficult.

The site team tried the Control Systems Community Forum.

Within 24 hours, they had a contact at another power station with the same equipment that had just issued a reinstrumentation contract and were only too happy to sell off their spares and their old equipment.

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Access to Diesel and Gas Oil Dehazing Alternatives Saves One Million Euro

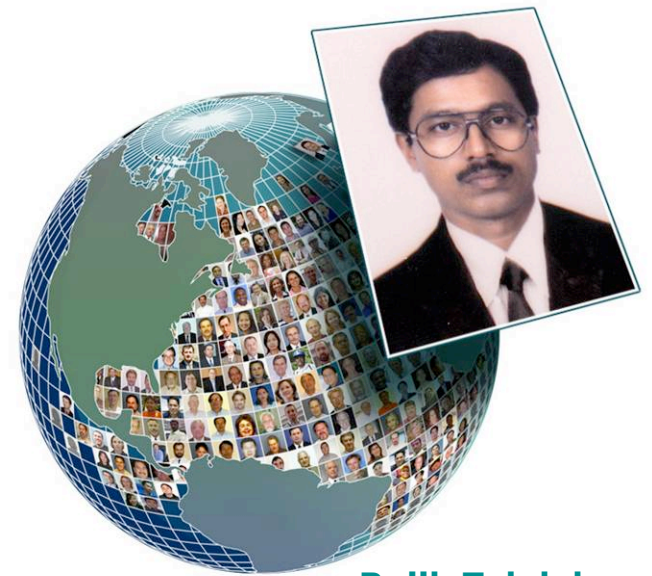
Client design basis was an electrostatic coalescer and salt bed drier with a water cooled chiller

Saved 1,000,000 Euro

Access to design manuals, expert responses, and past project references resulted in a recommendation to eliminate the salt bed dryer

Client very pleased

New 700,000 Euro work-order has been awarded for a similar study at another refinery



Rajib Talukder
Kuwait

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Strategies to Achieve a KM Vision

◆ Knowledge as a resource – *codification*

- Knowledge as objects
- Connecting people to databases
- Emphasis on knowledge reuse

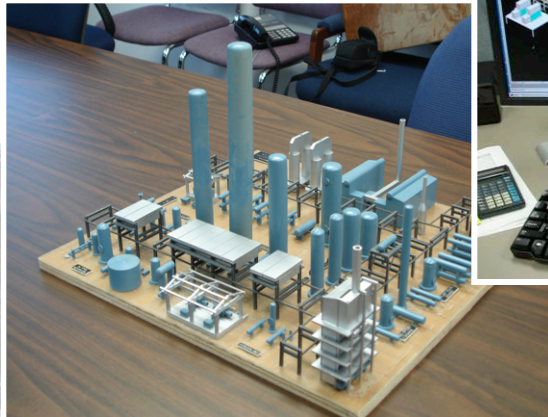
◆ Knowledge as a process – *personalization*

- Knowledge in people's minds
- Connecting people to people
- Creating people networks
- Emphasis on customized solutions to unique problems

As experts' solutions are documented, move them as fast as possible for scale and reuse

Conceptual Plant Design

- ◆ As much as 80% of project costs are committed during conceptual design



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- Process Simulation**

Connectivity Diagram

OptimEyes Model

Detailed 3D Plant Design

Actual Facility

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Early Decision Making

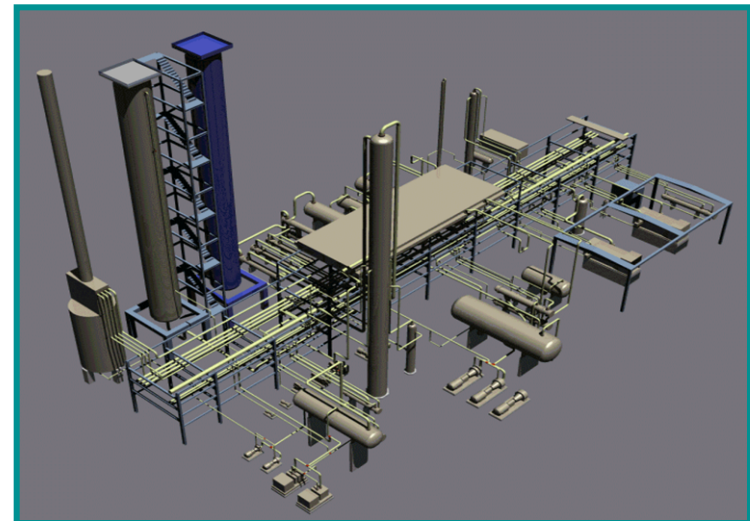
◆ OptimEyes

- Plot plan modeling
- Automatically routes pipe
- Develops 3D visualization of facility
- Generates bulk materials (piping, insulation & steel)

◆ Plant design and life-cycle analysis

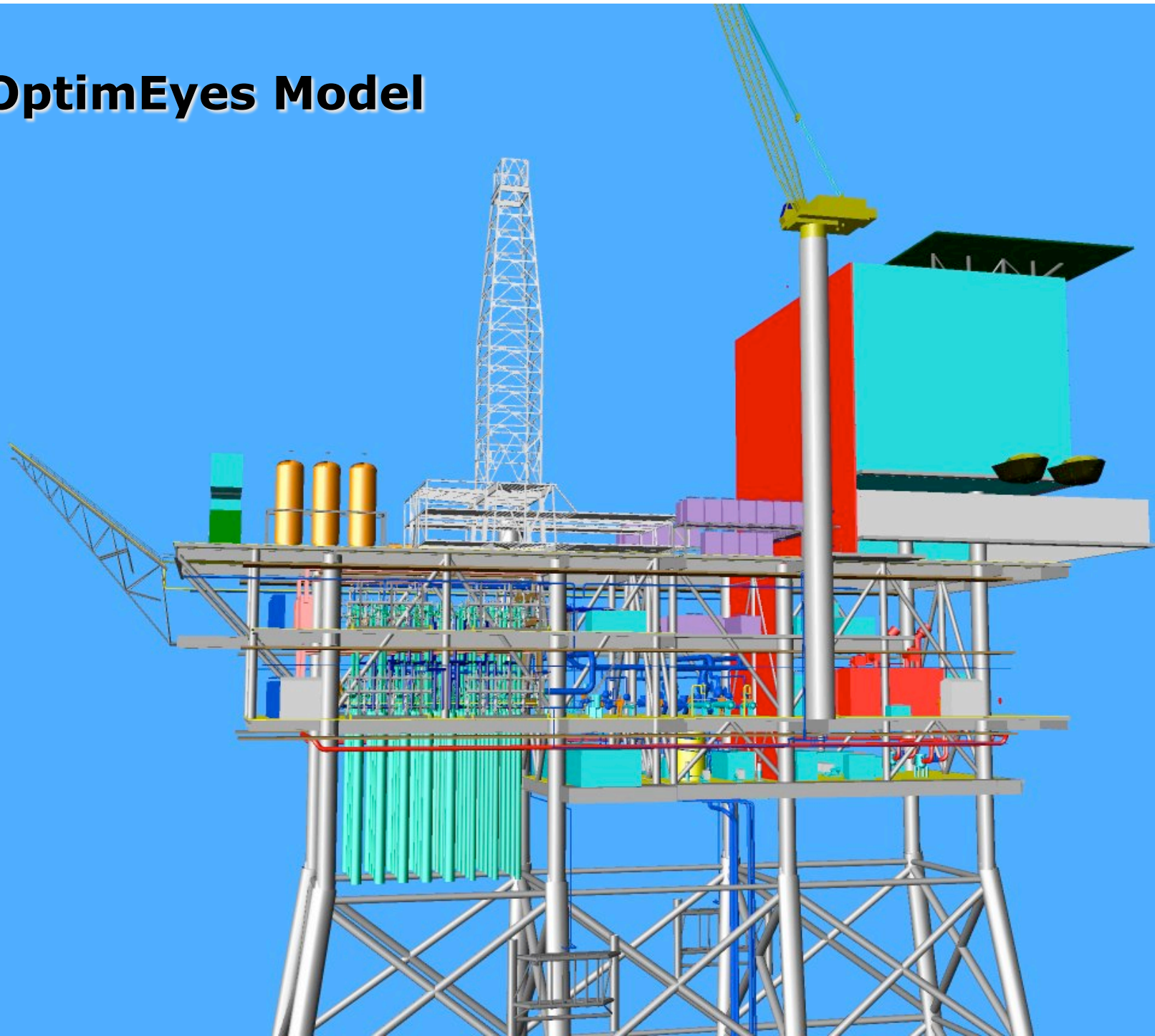
- Plot layout and optimization
- Material cost
- Minimize design changes
- Safety and Environmental requirements
- Constructability
- Operations and Maintenance considerations

◆ Zero-Percent Model Review

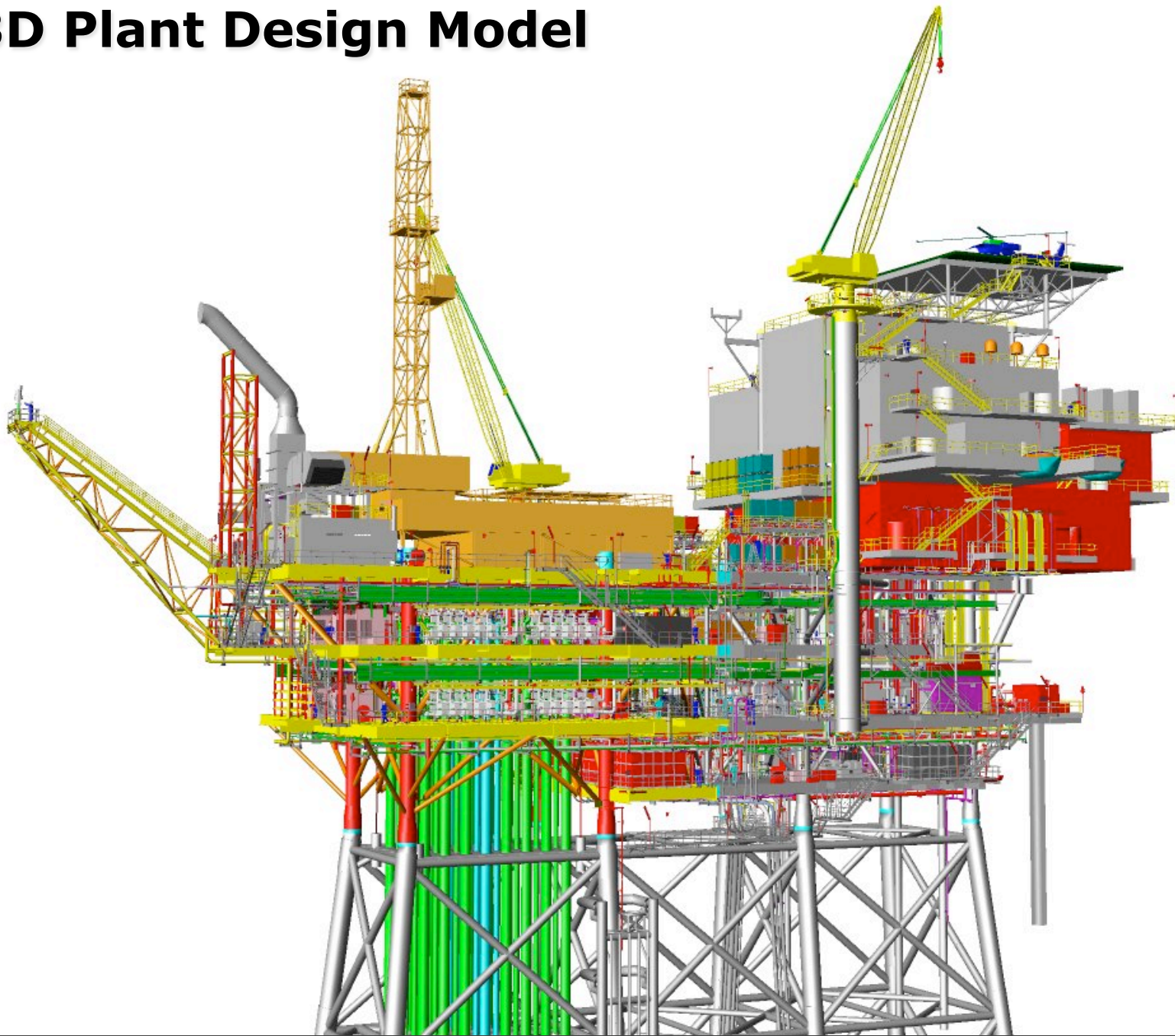


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OptimEyes Model



3D Plant Design Model



Actual Facility



Knowledge Management and Rules-Based Design Convergence

- ◆ **Next Generation Project Execution Platform**
 - New 3D and integrated design solution
 - Work process and organizational changes
 - Rules throughout engineering and design
 - Rules-aided design reuse
- ◆ **Subject matter experts to supply and update rules**
- ◆ **Rule management system to protect IP**
- ◆ **Links into *Knowledge OnLine* to support the process**



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Key Success Factors

- ◆ Knowledge management and rule-based solutions provide significant performance improvements
- ◆ Client perceive as valuable
 - Planning solutions
 - Solutions to make better decisions earlier
- ◆ Clients must have a compatible decision-making capability
- ◆ People will always be part of the process
 - Intuitive human-computer interface





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