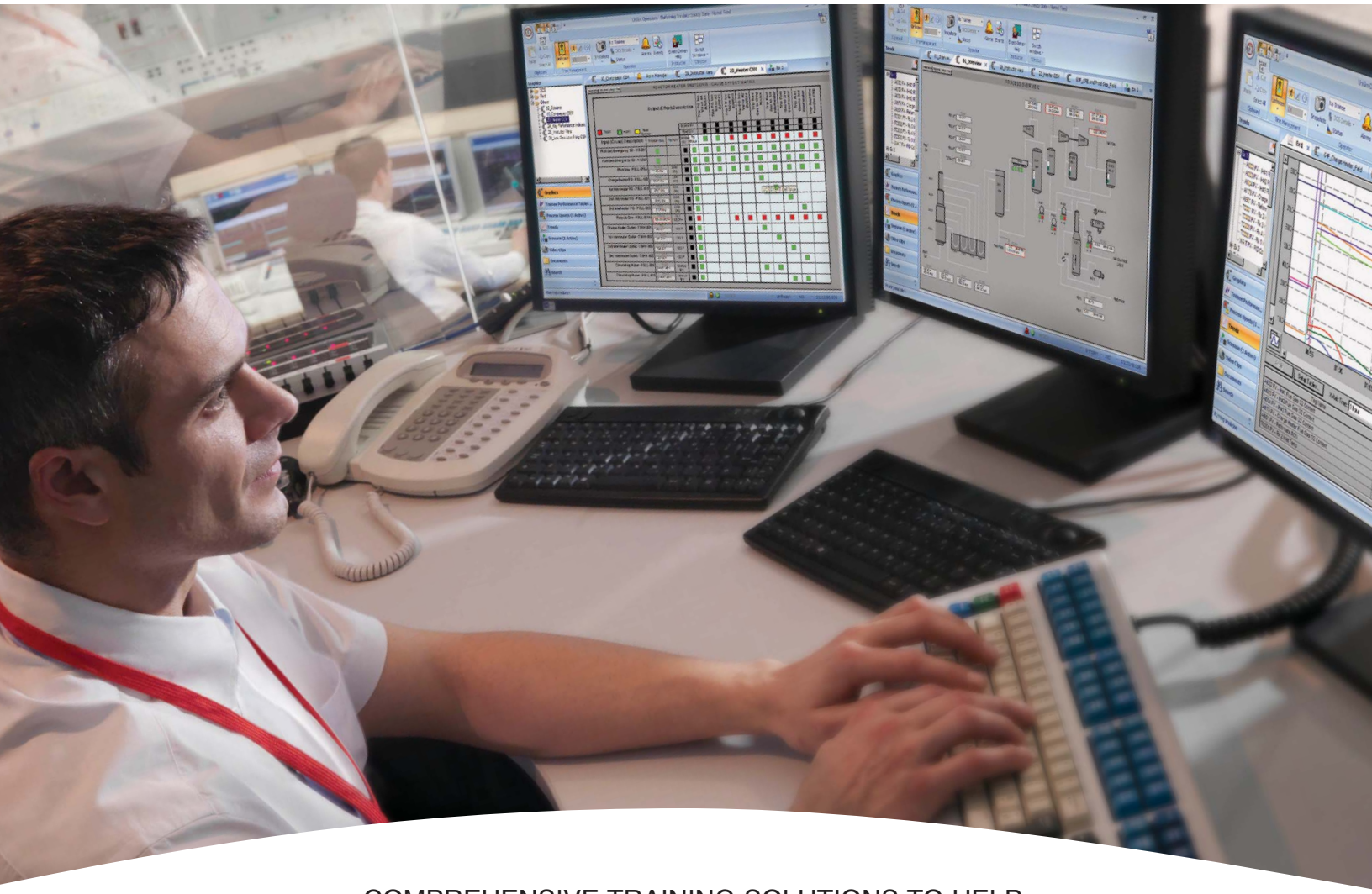
UOP Training Engagements



COMPREHENSIVE TRAINING SOLUTIONS TO HELP
ENSURE THE ONGOING PROFICIENCY OF YOUR STAFF

Help improve your staff's competency and reduce the chance of human error with UOP training solutions

UOP
A Honeywell Company

U.S. process plants lose more than $20 billion* a year from abnormal operating situations. $10 billion is directly related to human error caused by insufficient employee knowledge or operator and maintenance worker errors. As technology advances and new operators enter the workforce, it's imperative that your personnel are properly trained to identify, evaluate and rectify problems. UOP has more than 90 years experience developing and transferring technology. Our comprehensive training solutions transfer knowledge, skills and behaviors from our experts to your staff to help ensure the long-standing safety, reliability and profitability of your operation.

Inadequately trained personnel hinder profit, operational efficiency and safety

Workforce challenges for the modern refinery

From regional expansions to the impending retirement of skilled workers, a shortage of experienced refinery personnel is growing worldwide. In response, many refineries are hiring younger, less experienced staff and must quickly train them in an increasingly complex technical environment.

Although profitable, this complexity can inhibit an inexperienced operator's competency and ability to handle upset conditions. Long operating cycles, resulting from the increased reliability of advanced technology, can prevent personnel from experiencing start-ups and shutdowns – depriving them of the experience gained during the periods of operation when incidents most often occur.

Limitations of traditional training

In the past many refineries have relied on traditional methods, such as peer-to-peer or classroom training, to transfer knowledge to inexperienced personnel. When not integrated with more methodical techniques, these mediums can lack effectiveness because the quality of training depends on the expertise and mentoring skills of the journeyman. Additionally, infrequent upset conditions, or a lack of upsets altogether, can lengthen the duration of training.

Proven methodology

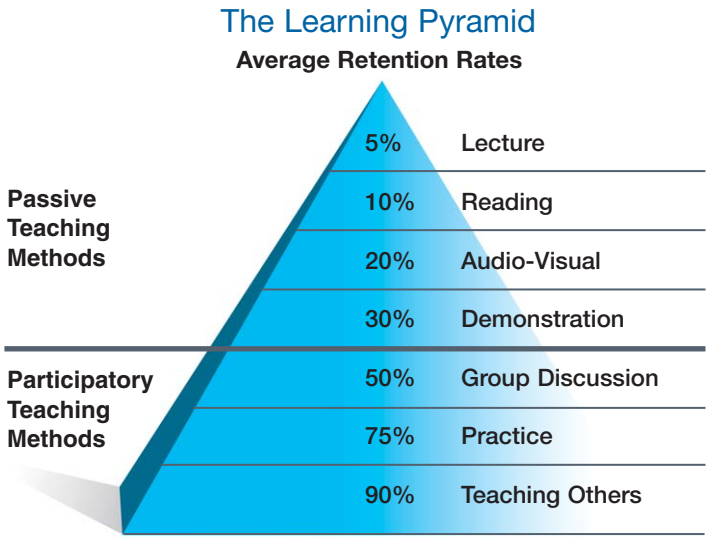
Studies show that information is best retained when using participatory teaching methods, such as group discussion, practice and teaching others. These methods effectively help your staff understand plant procedures and develop instinctive behavior. Our comprehensive training portfolio is built around this methodology and integrates a number of participatory mediums to help your staff maximize competency and retention.

We leveraged our robust knowledge and experience in research and development, engineering, and technical and optimization services to develop our state-of-the-art training solutions. Our curricula are designed specifically for UOP technology, so you can feel confident knowing your staff is receiving the most relevant information for the safe and efficient operation of your plant's process units.

Complete lifecycle training solutions designed for your needs

From engineering design through ongoing operation, UOP offers a variety of technical training programs to supplement your existing personal, interpersonal and functional training curriculum. These programs include training for individual process technologies and specialized equipment.

For larger training requirements through the project's lifecycle, we offer comprehensive training programs. These programs can vary from web-based training site licenses to engagements that support new complexes from concept through start-up and beyond. These engagements are designed alongside refinery personnel and include multiple training platforms to help ensure ongoing operational excellence.



Adapted from, National Training Laboratories, Bethel, Maine

*Abnormal Situation Management Consortium®

Web-based training

Web-based training is a cost-effective, flexible training tool that allows a large group of personnel to learn process technology basics at their own pace without time away from the plant. By incorporating interactive graphics, animations, quizzes and learning assessments, retention is improved compared to reading a book or listening to a lecture. Web-based training can be used for stand-alone technology training, as pre-work for an instructor-led course or for refresher training. Built-in competency assessments evaluate your staff's knowledge intake and track their performance.

Instructor-led classroom training

This customizable training delivery method develops the knowledge, skills and behavior of your personnel through traditional lectures, Q&A, case studies and process simulation. Courses are developed and presented by UOP technical experts utilizing adult learning methodologies, and include a high degree of interaction between students and instructors. Our multi-company courses allow engineers and operators to attend courses alongside participants from other companies, while our single-company courses deliver customer-specific training.

Expert Systems

Expert Systems is a UOP-developed computer-based tool to troubleshoot operating issues. Developed based on decision tree diagnostics, this self-paced tool can be used for training or for troubleshooting upset conditions.

OpAware™ system

The OpAware system provides a regular automated summary of your process performance. The tool gives your process engineers valuable insight based on key performance metrics established by UOP process technology experts. It enables real-time collaboration between your process engineer and UOP technical specialists to analyze processes and make improvements that will maximize your on-stream performance and profitability.

Training simulators

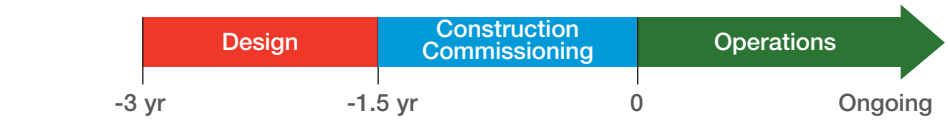
Training simulators enhance the effectiveness of a training program by giving personnel an opportunity to apply knowledge and practice skills learned in the classroom. This hands-on experience gives operations staff an added level of confidence, security and knowledge to function competently during pre-commissioning, startup, steady state operation, emergencies and long-term operation.

Unlike other training simulators, UOP embeds proprietary reactor models, operating philosophies and engineering expertise directly into the training simulator software. Our simulators include realistic exercises that reproduce emergency situations and allow operators to experience in a matter of weeks what would typically take years to experience. Like web-based training, competency assessments are incorporated into this platform to help ensure personnel maximizes their training experience.

Residency program

The UOP residency program, also known as the career development program (CDP), is a long-term training program that takes place alongside our technical experts. This program offers a learning track similar to that of a new UOP engineer and can include engineering design, advanced skill engineering, technical service and field service training. The residency programs utilize a combination of the mentoring process, a team environment and continual feedback through assessments. This program is a fast-paced experiential knowledge transfer, exposing the engineer to a large number of situations in a short amount of time.

Training Solutions During Project Lifecycle



Engineers			
Skills to gain	• Engineering design • Start-up and troubleshooting	• Detailed understanding of procedures and technology	• Troubleshooting • Refresher or new technology • Engineering, troubleshooting and operations
Tools	• Engineering & tech service residency programs	• Instructor-led training with web-based training • UOP training simulator • Field residency program	• Residency program • Instructor-led training • Web-based training • Expert Systems • UOP training simulators • Engineering design seminar
Operators			
Skills to gain	• Operations and upset scenarios	• Pre start-up operations	• New operator competency • Refresher assessments
Tools	• UOP training simulators	• UOP training simulator • HPS custom training simulator	• UOP training simulator • HPS custom training simulator
All			
Skills to gain	• Technology basics	• Technology basics	• Technology basics
Tools	• Web-based training	• Web-based training	• Web-based training

Customized training curriculum

Customizing a training curriculum is easy with the support of our experts. We consider your plant, and the needs of your staff, to develop an effective custom solution. Below are examples of what a custom program may look like.

A greenfield refinery is being established. A concept-to-completion UOP training program was designed to teach all aspects of plant operations

Key technologies: UOP Unicracking™, UOP CCR Platforming™ and UOP Penex™ processes

Web-based training

- Site license for 250 yearly training seats to introduce engineering and operations personnel to key technologies in the new plant

Instructor-led training

- Three courses for each technology, with up to 20 students per course. Delivered on-site one year before mechanical completion

Instructor-led simulator-based training

- CCR Platforming and Unicracking simulators with up to 20 students per course. Delivered on-site to operations personnel one year prior to mechanical completion for general start-up and operations training. Delivered again six months prior to mechanical completion for start-up refresher training and emergency procedure training

Training simulator

- UOP custom training simulators completed and available for use one year prior to mechanical completion

Residency program

- 12-month Field Service Residency. Initial six months of technology training to be held in UOP's offices, followed by six months of field inspection and start-up training on UOP units with UOP start-up crews.
- Eight-month Engineering Residency at the start of basic engineering design. Personnel works on project teams to design refinery units and participate in UOP's 41-day engineering design seminar
- 12-month Technology Service Residency held 18 months prior to mechanical completion. Personnel works alongside UOP experts in an office-based troubleshooting capacity on Unicracking and CCR Platforming technologies

A new FCC unit has been installed in an existing refinery. We customized a UOP training program to introduce staff to the technology and train on operations and troubleshooting

Key technologies: UOP FCC and UOP Merox™ processes

Web-based training

- Site license for 80 yearly seats, available for 12 months

Instructor-led training

- Covers FCC technology and FCC operations/troubleshooting. Available for 20 engineering and operations personnel per course. Delivered 12 months before mechanical completion

Training simulator

- Custom-designed FCC Training Simulator to mirror existing processing unit. Delivered 12 months before mechanical completion

Instructor-led FCC simulator-based training

- Covers normal start-up and emergency procedures. Available for 20 operations personnel. Delivered three months prior to mechanical completion.

OpAware system

- Installation of FCC OpAware operations monitoring and reporting software with quarterly operation evaluation reports

Expert Systems

- Installation of FCC catalyst containment and FCC main column operations Expert Systems troubleshooting software

This refinery evaluated its internal learning management and employee development systems and determined some gaps. We customized a UOP training program to supplement the current curriculum

Key technologies: UOP FCC, Unionfining™, UOP CCR Platforming™ processes

Web-based training

- 50 seat site license with access to all UOP training modules

Engineering design seminar

- Two seats per year to UOP's 41-day engineering design seminar

Training simulator

- UOP training simulators, including access to operations and troubleshooting manuals

Responsible Care®

As part of our ongoing commitment to quality and safety, we are a member company of the American Chemistry Council, and Responsible Care is the foundation for sustainability in our business. Our global Responsible Care Management System is used to support our full commitment to comply with legal and other health, safety and environmental (HS&E) requirements to which we subscribe.

Find out more

If you are interested in learning more about UOP training solutions, please contact your UOP representative or visit us online at www.UOPtraining.com.

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