Omega Simulation Co.,Ltd.
A YOKOGAWA company

Simulator for Process Education

OmegaLand Educator

Connect people with the virtual process

OmegaLand Educator is a simulator for process education developed to learn the fundamentals, rules and principles of chemical engineering. It incorporates plant dynamics simulators (virtual processes) that are utilized in various process industries and have high reproducibility.
The virtual processes composed of the physical models based on the physical laws create dynamic behaviors that make it possible to provide a realistic learning environment that cannot be achieved through e-learning.

Importance of Onsite Education

Education and Training

Education can be defined as "teaching and cultivating people and changing these people in a desired manner by making them learn knowledge and skills". Training, on the other hand, can be defined as "continually practicing an actual activity to master it so that it can be well performed".

Education and Training Required for Production Sites

Generally, in order for engineers / operators engaged in plant operation to acquire operating skills and techniques, it is considered important to acquire experiences and skills through OJT (on the job training) conducted during operation work and through classroom lectures. However, it is not easy to make use of the knowledge gained in lectures for executing operation tasks immediately, and an effective educational environment suitable for the workplace is needed. OmegaLand Educator was developed based on these needs, to enable learning the behaviors close to a real plant experientially, as a complement to the knowledge gained in classroom lectures. In addition, it can be used to smoothen communications and the transfer of technical knowledge between experienced and junior engineers or operators.

The knowledge acquired in lectures can be mastered by hands-on learning that contributes to the training of engineers and operators to sharpen their analytical capabilities and responsiveness.

What is OmegaLand Educator?

Collection of Process Education Simulators

OmegaLand Educator is a collection of process education simulators developed on the integrated environment for dynamic simulation OmegaLand which is also used for building plant operation training simulators in a wide range of applications such as LNG, petroleum refining, petrochemical, chemical, and water purification plants. The simulators have been prepared for different purposes, and by learning the principles and rules through a simulator, it is possible to support training for improving the analytical capabilities / responsiveness of engineers and operators by providing them learning experiences closer to actual plants for each unit operation.

Purposes of OmegaLand Educator

The aims of OmegaLand Educator are,
- **Learn the principles and rules of processes**
- **Learn how to appropriately operate equipment and understand their operation principles and performances**
- **Understand the behavior of the control systems and processes, the basics of control action and adjustment rules**
- **Learn the required knowledge for process operation**

One of the environments necessary for efficiently achieving these objectives is a learning environment using a dynamic simulator and a workbook together. There, participants can learn efficiently through the communication between instructors and students that participate as protagonists. OmegaLand Educator provides the best environment for such education.

OmegaLand Educator

Features of OmegaLand Educator

Faithfully Reproduces Process Behavior

OmegaLand Educator uses a dynamic simulator with rigorous physical models based on chemical engineering, so that changes in flow rate, pressure and temperature of processes affected by valve positions are faithfully reproduced. Therefore, the behavior of on-site processes can be learned in a graphically easy-to-understand environment.

Systems for Obtaining High Learning Effect

The learning environment provided by OmegaLand Educator is designed so that a high learning effect can be obtained in all applications through an "understand - experience - confirm" pattern. Therefore, each application includes teaching materials and auxiliary materials for instructors according to learning themes, workbooks for students, study items to be experienced through the simulators, and practical simulator exercise to confirm the degree of understanding of students.

- **Understand:** Understand the theory with an instructor or through self-study
- **Experience:** Experience by practical training using a simulator
- **Confirm:** Verify the degree of understanding using a simulator

Covers Topics from Acquiring Principles and Rules to Mastering Unit Operation

The OmegaLand Educator simulator consists of an "Operation Principle Edition" focused on rules and principles, and "Basic Unit Edition" focused on unit operations. In the "Operation Principle Edition", it is possible to master the ability to respond to different situations depending on the processes through equipment at the production site and its basic operation, from the process principles and the basic operation of the equipment which are not specific to the processes, and through the operation of equipment combinations that are plant specific. In the "Basic Unit Edition", basic plant operation can be mastered by using general purpose process units as themes.

Determining the Causes of Abnormalities

The essence of plant operation is to think about the significance of the plant facilities, to understand the "principles" and "rules" behind them, and to acquire the skills to deal with various problems that can occur in reality in the plant. In the "Basic Unit Edition" of OmegaLand Educator, since typical phenomena that can occur in actual equipment can be generated, the ability to investigate the cause of abnormalities can be acquired from a so-called "scientific thinking" series of steps based on the behavior of the process: problem grasping → prediction → observation → action → consideration.

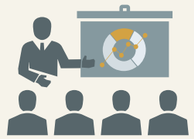
Corresponds to Various Learning Styles

Environment Adaptable to Learning Styles

The OmegaLand Educator system is built so that it can deal with various learning styles. Particularly in the network version, since it is possible to manage student registration, the assignment of attendance item lists, learning records and results, it is possible to build an education curriculum efficiently.

Instructor-led Learning

Each student can operate the simulator. Cooperative operation by multiple students is also possible. From the instructor's monitor screen, the operation contents of all students can be monitored.



Self-paced Learning

Students can select practice items for learning and self-study.

Self-paced Learning with Support

The instructor can verify the operation contents of students from remote locations, and it is possible to provide assistance through messages.

Mentor Learning

Participants can prepare and review together with control room colleagues before group learning.

Application List

Classification	Application	Overview
Operation Principles Edition	Material and Heat Balances	The purpose of this simulator is to learn about material and heat balances through the combustion reaction of butane and the recovery of combustion heat.
	Fluid Transportation	The purpose of this simulator is to learn about the basics of fluid transportation by carrying water through a pipe.
	Heat Transfer	The purpose of this simulator is to learn about heat transfer through a process that removes heat from a polypropylene polymerization reaction by use of two external circulation coolers.
	Process Control	The purpose of this simulator is to learn about the basics of process control which targets equipment generally present in chemical, petrochemical, and petroleum refining processes.
	Reaction	The purpose of this simulator is to learn about a gas phase reaction in a fixed bed and a liquid phase reaction in a continuously stirred tank reactor (CSTR).
Basic Units Edition	Distillation	The purpose of this simulator is to learn about topics such as distillation operation and control, and topics related distillation operation theory through the distillation separation process of a water-methanol mixture.
	Compressor	The purpose of this simulator is to learn about the basis of operation of the gas compression process based on a centrifugal compressor and the ancillary equipment used in an ethylene plant.

Functions List

List of functions provided by the OmegaLand Educator system.

Functions	Functional overview
Loading Initial Conditions	At the start of learning, the starting state of the simulator according to the learning theme is called an initial condition. This is a function to load its initial condition into the simulator.
Run/Freeze	The simulator can be started or paused.
Snapshot/Stepback	The learning progress status can be temporarily saved to a memory (snapshot). A saved state can be restored if necessary (stepback). With this, it is possible to return to the same state and repeat learning procedures over and over. In addition, a state temporarily saved as a snapshot can be definitely saved as an initial condition*.
Replay Evaluation*	This is a function that can reproduce operations as they were performed, after finishing learning. The instructors can review the contents of the study with the students.
Scenario Selection*	Depending on the learning theme, a set of preset operations and simulator's condition (scenarios) can be selected.
Time Scale Change	The simulation execution speed can be changed to 1/8, 1/4, 1/2, 2, 4, 8, etc.
User Management*	Students and instructors can be assigned for each application that can be started and for each scenario that can be applied.
Certificate Issuance*	When a pass or fail judgment is set for the studied scenario, a certificate can be printed and saved.
Record Reference*	It is possible to refer to the learning record (such as attendance records of the scenario, operation contents, evaluation results). The administrator can refer to the learning record of all students. The instructors can refer to the learning record of the students at their charge, and the students can refer to their individual learning record.
Remote Use*	A user assigned to the system can access the learning record and the scenarios that can be taken via a browser on a PC that can connect to the server. The instructor can refer to the operation contents and learning record even if the student is located in a remote area, and can change the state of the simulator and operate it remotely.

*Functions available only in the network version.

System Requirement

Please refer to our company website for System Requirement. URL:https://www.omegasim.co.jp/contents_e/solution/edupack/

Education Course

We also offer educational courses that allow to practice OmegaLand Educator lectures efficiently and to acquire the knowledge necessary for setting up the system environment of OmegaLand Educator for instructors so that you can build your own curriculum. All courses are done in a classroom style, and will enable acquiring knowledge about OmegaLand Educator by lecture and hands-on workshops. Please contact us to inquire about the number of people who can participate and other details.

Course name	Period	Course content
Basic Course	0.5day	The system outline and basic operation method for learning of OmegaLand Educator can be learned.
Operation Principle Course	0.5day	This is a course for which each simulator is provided as an operation principle edition. Learn about the outline of the simulator and points of the main exercises and study while actually operating the simulator.
Basic Unit Course	1.5day	This is a course for which each simulator is provided as a basic unit edition. Learn about the outline of the simulator and points of the main exercises and study while actually operating the simulator.
Education System Management and Utilization Course	0.5day	This course teaches how to set up the OmegaLand Educator network version server. This course teaches how to set up and manage the educational environment, such as user registrations and modifications, student group registrations, the allocation of scenarios to students and groups, the reference methods of educational record, and the outline of backup method of set contents.

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