



Clean Health Safety NEWS

11

NOVEMBER 2013

No.658

セーフティニュース【毎月1回発行】

Technology For Defense

**英国DSTLと
防衛省技術研究本部が
飯能研究所を見学**

エチルベンゼン塗装業務の対策事例
船づくりの最前線を担う塗装現場

**必要なのは視界が良く
丈夫なマスク**

 **興研株式会社**
<http://www.koken-ltd.co.jp/>

モミジの枝で餌を捕る一瞬を待つカワセミ 写真：アフロ

013



“KOACH can create a localized clean environment anywhere and is easy to move when needed. This is an important feature of KOACH because a laboratory layout in the ship is required to change as the purpose of its voyage is changed.”

Deep Sea Drilling Vessel (D/V) CHIKYU is the first riser equipped scientific drilling vessel which is capable of drilling up to the mantle and seismogenic zone. Thanks to a localized clean zone formed by KOACH, researchers can now analyze the sediment cores taken from the deep seabed without being affected by atmospheric environment.

KOACH’s clean technology will help facilitate the study to explore the mystery of the deep subsurface biosphere.

Sediment samples taken from the deep Earth by D/V CHIKYU are called “Cores,” and they are valuable records of global environmental change. Detailed analysis of such records enables the understanding of global change mechanism and prediction of future change. The first life form was said to have appeared on primeval earth which was characterized by high temperatures, high atmospheric pressure and no oxygen. There still is the environment similar to the primitive earth in the deep part of the present earth. Research into microbes in such extreme environments may resolve the secret of the origin of life.

A 9.5m-long sediment core recovered by D/V CHIKYU is to be distributed to researchers for micro biological analysis, paleomagnetic study, paleontological study, lithological analysis, and geochemical study etc.

Kochi Core Center (KCC) houses one of the 3 core repositories in the world as part of the International Ocean Discovery Program (IODP) and at the KCC the IODP cores are stored and provided to researchers around the world for their analyses and studies. As of April, 2013, the KCC contained

about 94 km of cores, which were drilled and collected from the Indian Ocean and Asia-Oceania regions.



Dr. Chiaki Igarashi
Doctor of Engineering
Technical Head of Center for Deep Earth Exploration
Japan Agency for Marine-Earth Science and technology (JAMSTEC)

【Page 13】

What was needed for our study was a type of equipment that can make the most of a limited space in the vessel.

In the study of geochemistry, gasses and liquids contained in the cores are also precious samples. They should be sampled in an anaerobic environment and these samples should be treated and analyzed in a clean environment without being affected by surrounding contaminants.

To this end, KOACH's clean zone forming technology now plays an important part at the laboratory on board D/V CHIKYU, but at the time of equipment purchase, there was a challenge they faced.

▲ What made you think of installing a KOACH?

One of my responsibilities as a technical head is to maintain experiment environment and equipment in good condition so that studies on board D/V CHIKYU are conducted smoothly and effectively.

A researcher from the KCC of Japan Agency for Marine-Earth Science and Technology who had already purchased a KOACH for their study using the drilled cores as specimen requested us to install a KOACH in the laboratory on board D/V CHIKYU.

However, we did not want to expand facilities further because the laboratory space was limited due to a lot of equipment to meet multipurpose studies.

At first, we thought that the researcher was requesting from his selfish motive. But, he insisted that we should take a look at KOACH before making a judgment, which prompted us to go to the exhibition that was just taking place. There we observed a KOACH in operation and instantly realized why he made a strong request for its installation.

▲ Why did you decide to purchase a KOACH?

When installing a new piece of equipment, it is unanimously true to examine the effectiveness of the equipment in the new environment.

On board D/V CHIKYU various fields of research including a trial extraction of gas from a layer of methane hydrates and an investigation of the earthquake mechanism are conducted for each expedition. Therefore, we examine cost and space requirement carefully when considering a new installation of equipment in a limited space of the laboratory in the vessel.

Even after having understood the superior ability of KOACH, we examined its merits carefully. As a result of such careful consideration, we finally concluded that the KOACH has a big advantage in forming a localized clean zone anywhere and moving it anywhere when needed. This was an important point for our judgment because of the limited space in the vessel.

【Page 14】

KOACH embodies a superior technology to create a clean zone to protect precious core samples.

▲ How do you use a KOACH?

Core samples drilled from under the deep seabed must be kept in the same conditions as in the seabed when being retrieved to the surface. Otherwise, they cannot be used as subjects for a study. In particular for microbial researchers, microorganisms living in the atmospheric environment are major foes and if they are mixed into the core samples, it becomes impossible to confirm which type of microbes are existing in the deep seabed, which leads to the total loss of the precious information under the seabed.

Mixing of a single microbe may ruin the precious core sample entirely. For that reason alone, we want to analyze the core samples in the same condition as in the seabed environment.

A core sample of 9.0 meters in length is cut into 1.5 meter-long pieces and stored in a frozen storage. They are still further cut into small pieces for analysis. For this operation maintaining a clean condition is critically important. Although a clean bench was used in some cases before, the core samples were normally brought ashore without being cut into small pieces on board a ship to avoid external contamination.

After the installation of the Table KOACH, a clean zone can be locally formed where a clean bench could not be placed previously, thus analysis of core samples can be conducted on board a ship now.

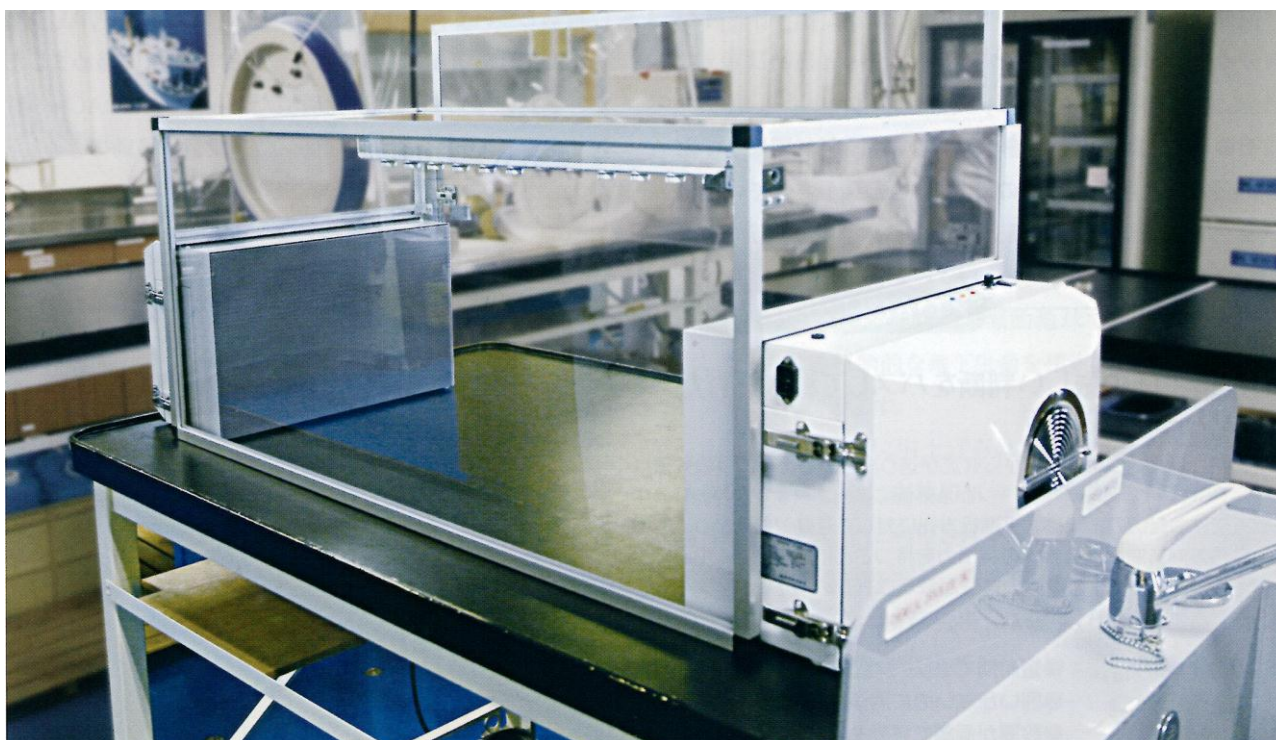
▲ You were using a clean bench, weren't you?

On board D/V CHIKYU a clean bench has been installed from the beginning. Once a researcher starts using it, he/she often leaves experimental instruments and samples behind inside the clean bench, so that other researchers have to wait in a queue.

Another problem was a layout change. Although the equipment layout of D/V CHIKYU is changed depending on the sailing purpose, the location of a clean bench is fixed. This will force researchers to move instead of vice-versa.

With the installation of a Table KOACH, a clean zone can be created locally in the limited space of the vessel by carrying it to the very location where necessary. This is a big merit for us.

Enabling two persons to work at the table facing each other is an unexpected surprise. This has broken our stereotype: only one person can work at a clean bench.



At the center of the microbiology laboratory on D/V CHIKYU a clean zone is locally formed. Even with the protective canopy installed, a researcher can observe things squarely without suffering an oppressive feeling.

【Page 15】

▲ Were you not worried about a wide opening in front?

We did not have any doubt about its effect on board the vessel because the researchers from KCC gave their seals of approval to this equipment after having used it actually.

At a demonstration in the exhibition, the Koken staff persuasively explained to us that contaminants accumulated inside can be quickly discharged only because of its open structure. As there is a saying that seeing is believing, we observed with our own eyes that an ISO Class 1 environment was realized in a blink of an eye. No room for doubt!

▲ What is your thought about the future use of KOACH?

For a seafaring country like Japan, researches on board D/V CHIKYU are increasingly important, considering that they are closely related to resource exploration, disaster prevention and disaster reduction. Thanks to the installation of KOACH, we have gained a great advantage in terms of workability, operation and administration.

With the use of KOACH, we hope to achieve a good result to come closer to resolving the origin of life on Earth.