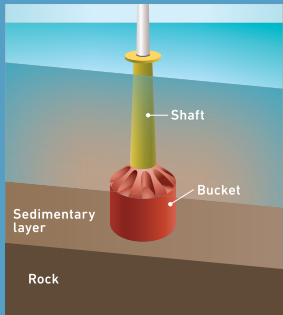
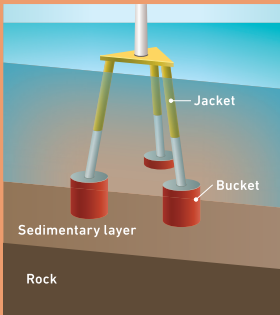
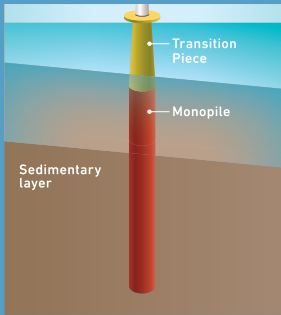
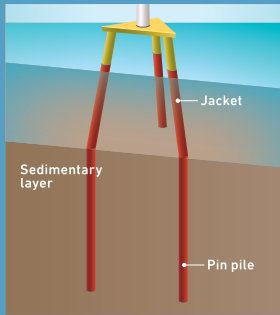


Multi Suction Bucket Foundation

マルチサクションバケット基礎

■ Applicability to Larger Turbines

Suction bucket foundations are classified into "mono-bucket" type and "multi-bucket" type based on the number of buckets. Both use water pressure inside the bucket for penetration, so their construction methods are the same. However, they behave differently with respect to the horizontal load after the wind turbine is mounted, similar to the relationship between monopiles and jackets in the driven pile method. The "multi-bucket" foundation can resist larger loads by increasing the distance between the legs as well as the bucket shape, thus providing greater design flexibility and making it suitable for larger wind turbines.

Diagram	Suction Foundations		Driven Pile Foundations	
	Mono-bucket	Multi-bucket	Monopile	Jacket
				
Base	⊙ Relatively thin layer is applicable	⊙ Relatively thin layer is applicable	△ Thick sedimentary layer required	△ Thick sedimentary layer required
Workability	⊙ Integrated bucket is inserted by suction pressure	⊙ Integrated multiple buckets inserted by suction pressure	○ Large-diameter pile is hammered, TP connected by grout	△ Multiple piles hammered, jacket connected by grout
Large turbines	△ Bucket diameter and height becomes large	⊙ Bucket gets larger when legs widened	△ Pile diameter and length becomes large	⊙ Widen legs to suppress pile enlargement

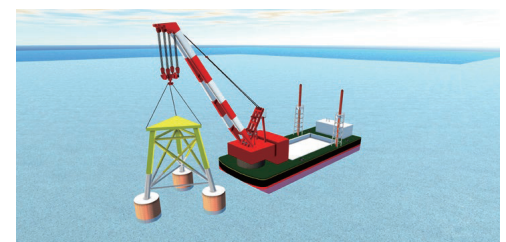
■ Experiment to Verify Workability

In previous studies, basic workability has been verified using mono-bucket models. Multi-buckets have the advantage of controlling the verticality of the entire foundation by controlling the amount of penetration of each bucket using multiple pumps simultaneously. In FY2021, we conducted laboratory tests and conducted penetration tests of a tripod multi-bucket foundation with a diameter of 700 mm. In FY2022, we conducted a field experiment using a model five times larger than the indoor test (or about 1/5 scale model).



■ Toward Social Implementation

We will continue to consider market trends, the latest technologies, and infrastructure development for offshore wind power generation, and develop technologies that are in step with current trends.



These results were achieved through a project subsidized by the New Energy and Industrial Technology Development Organization (NEDO).