

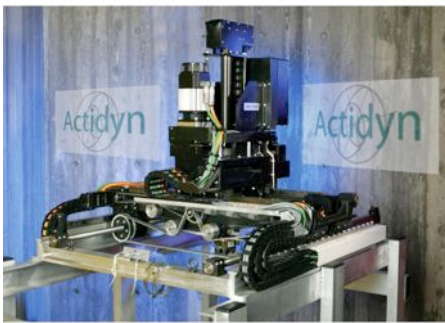


Equipments for test in centrifuges

ACTIDYN CONTROLLED TOOL SYSTEM (ACTS)

Use of remotely controlled tool systems on board of large civil engineering centrifuges have been envisioned for nearly ten years before such possibility became effectively available at L.C.P.C. in the mid of 1996.

4 degrees of freedom robot



This Cartesian type ACTS may be directly supported by the platform and remains in place independently from the model containers.

Alternatively the model container can also support it.

The ACTS is designed to operate at acceleration up to 100 g's.

The four remotely controlled degrees of freedom are: X, Y, Z linear and θZ rotation.

Tools storage



This configuration permits to position the selected working tool in any desired position while contouring obstacles present in or part of the studied model.

Tools which are interchangeable in flight are stored in a specific location where they can be kitted and retrieved.

Tools which are identified by digital coding are set prior to centrifuge rotation as per test needs.

Pincer tool



The tools share a common mounting interface that includes fluids and electrical connection.

Tools are therefore an active complement to the ACTS and executes controlled operation such as:

- Foundation loading or unloading
- Driving piles
- Soil resistance measurement
- Surface plowing or scrapping

Cone penetrometer



The ACTS is an elegant and powerful replacement to several specialized devices such as:

- Cone penetrometer
- Foundation loading equipment
- Scissometer

It can be used also to construct and or modify the geotechnical model without stopping the centrifuge and therefore execute successive and repetitive tests prior during and after the model modification.

The AVTS is a fully computerized system which is remotely operated from the centrifuge control room while the core of the control system is located in a cabinet on board of the centrifuge.

Digital communication between the various control devices is made via an Ethernet network and optical fiber connection.

The axis control system consists of a ball screw assembly powered by an AC brushless motor and an AC to AC digital loop controller.

Position feedback and readout is derived from a direct drive brushless resolver.

An industrial grade programmable controller supervises the axis loop controllers and executes all safety tasks, real time computation of multiple DOF trajectory

Technical Data	Model	C61	C65-C67	C80	C84-C85
Mainframe					
Length	mm	800	1100	1500	Specification Per Request
Width	mm	500	700	1104	
Height	mm	750	950	1037	
Weight	kg	150	270	305	
Axis performances					
Y axis displacement	mm	400	600	978	
Y axis speed	mm/s	0 to 50	0 to 50	0 to 50	
Y axis force	N	+/- 250	+/- 250	+/- 250	
X axis displacement	mm	250	400	560	
X axis speed	mm/s	0 to 80	0 to 80	0 to 80	
X axis force	N	+/- 500	+/- 1000	+/- 1000	
Z axis displacement	mm	200	300	400	
Z axis speed	mm/s	0 to 50	0 to 50	0 to 50	
Z axis force	N	+/- 3000	+/- 5000	+/- 5000	
θ Z rotation	°	360	360	360	
θ Z rate	°/s	0 to 20	0 to 20	0 to 20	
θ Z torque	Nm	0.5	0.5	0.5	
Miscellaneous					
AC mains line voltage	V	380/480	380/480	380/480	
Number of phase		3	3	3	
Operating frequency	Hz	50/60	50/60	50/60	
Installed power	kW	3	5	8	
Operating temperature	°C	15 to 35	15 to 35	15 to 35	
Humidity (non condensing)	%	20 to 80	20 to 80	20 to 80	