



MMA BREWSTER

RAPID & REPEATABLE 24 VCROSS-CONNECTION TESTING

MMA Offshore, one of the largest marine service providers in the Asia Pacific region, and OneStep Power Solutions Inc., a US-based power system testing technology provider, recently completed a validation program aboard MMA Brewster, a DP2 vessel operating in the Timor Sea.

The program, which included the world-first deployment of OneStep Power's DCShortCUT, was designed to provide assurance of the vessel's capability to continue operations should a fault potentially occur on a distribution system supplied by two power supplies.



CLIENT / VESSEL

MMA Brewster



LOCATION

Timor Sea



TOOL

DCShortCUT



TESTS

12 x 24V DC
Cross-Connections



OUTCOME

Full fault-tolerance proven

CHALLENGES

MMA Brewster is a 2016-built DP2 vessel from VARD. Along with an open bus configuration, the vessel operates with 12 x 24V DC cross-connected systems – a common industry configuration for Platform Supply Vessels. Similar types of 24V DC cross-connections have been identified by industry stakeholders whereby the control power redundancy design could potentially compromise the cross-connection fault propagation concept for a Dynamically Positioned Vessel.

A potential fault downstream of cross-connected power supplies could propagate and have an effect on both supplies. If the problem propagates through the power supplies to their source, all other consumers fed by the same source are also potentially at risk. As such, a fault on one set of supplies could potentially cause the loss of multiple sections of a vessel.

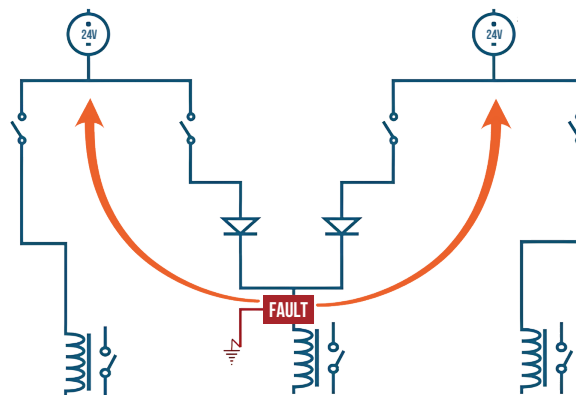
With the introduction of high reliability power supplies and electronic circuit protection devices, the risk of faults propagating through a DC cross-connection are able to be decreased. In the past, vessel owners such as MMA Offshore could not provide assurance to clients and stakeholders that the risk has been sufficiently mitigated through equipment selection and design.

SOLUTION

MMA Offshore contracted OneStep Power to perform a testing program to induce faults onto the cross-connected systems aboard MMA Brewster. OneStep Power and MMA Offshore jointly developed a testing plan for all 12 cross-connections and performed the onsite test plan, including UPS failure testing.

The onsite test protocol was designed in a way to reduce the vessel's downtime during testing to a minimum level, in accordance with all key stakeholders. The DCShortCUT and the ship's system were connected at multiple points to allow a variety of tests to be performed:

- Load Increase
- Overload
- Short Circuit
- Short to Ground / Earth Fault
- Variable over-voltage (max 120%)
- Loss of Power Supply



**INTRODUCTION OF A FAULT ON A
CROSS-CONNECTED CONSUMER**

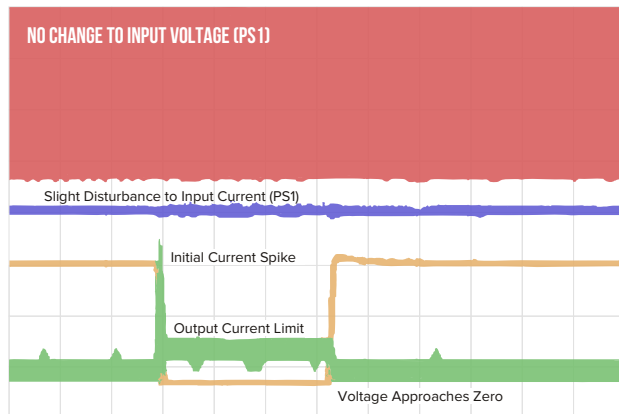
RESULTS

The project proved DCShortCUT as a viable methodology for proving cross-connection fault tolerance, and after the acceptance of the test results by MMA's client, MMA Brewster continued operations with safe and proven cross-connected 24V power supplies.

TEST RESULT EXAMPLE: SHORT CIRCUIT AT DIODE MODULE CONT.

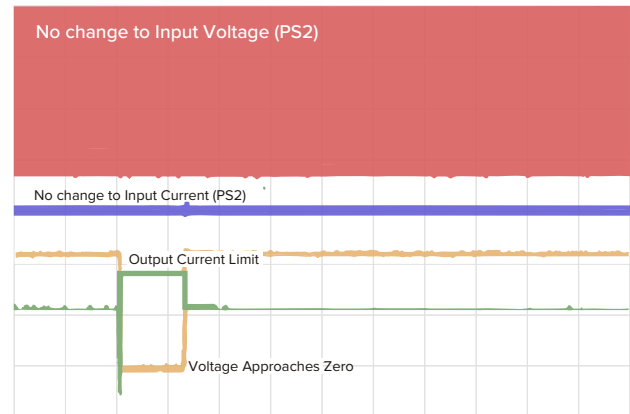


RESPONSE OF SHORT CIRCUIT AT DIODE MODULE OUTPUT



SCOPE 1

- Waveform A: PSU A1 Vac IN
- Waveform B: PSU A1 Iac IN
- Waveform C: PSU A1 Idc OUT
- Waveform D: PSU A1 Vdc OUT



SCOPE 2

- Waveform A: PSU A2 Vac IN
- Waveform B: PSU A2 Iac IN
- Waveform C: PSU A2 Idc OUT
- Waveform D: PSU A2 Vdc OUT

TEST PERFORMED	LOCATION	OBSERVATION / RESULT
Short Circuit	Diode Module	Isolated successfully, no spread detected.
Variable Over-Voltage (120%)	Main System Bus	No interruption. Protection systems held.
UPS Failure	Cross-connection 9	Partial power loss. Redundancy active.
Short to Ground	Consumer Node C3	System reset required. Test controlled.

“Taking a collaborative approach throughout, we were pleased to work with OneStep to ensure system fault resilience...”

— BARRY JEWSON,
MMA OFFSHORE, FLEET TECHNICAL GM

“A pleasure working with MMA Offshore’s agile and professional team...”

— SARAH WHITEFORD,
FOUNDING DIRECTOR, ONESTEP POWER

WANT TO LEARN MORE ABOUT DCSHORTCUT? CONTACT US