

# LDRA: Analox Lifeline for Compliance & Test Generation



## The Client

*Analox, is a leader in gas detection technology. With more than 30 years experience and penetration into 65 countries, Analox leads the way for a broad range of applications—anything from sport and commercial diving to carbon dioxide in beverages and gas sensing.*

## The Project

The LDRA tool suite was chosen by Analox for two projects demanding a safety requirement.

1. The dive monitoring system had to meet IEC 61508 SIL Level 1 for the systems and SIL Level 2 for the software.
2. The Analox Sub MkIIIF measures oxygen, carbon dioxide, pressure (depth), temperature and relative humidity and is ideal for hyperbaric chambers for HBOT and Submarine Rescue Vehicles (SRV). This application must meet IEC 61508 SIL 2 for both system and software.

Both projects used the Keil tool suite in conjunction with Hi-Tech PICC18 and MPLAB tool chains.



Sub MkIIIF version 2  
\*Photo courtesy Analox.\*

## Project Requirements

The need for compliance coupled with the need to gain competitive edge when bringing products to market, demanded superior tools and superior processes.

- Standards compliance — To ensure best practise coding, Analox chose MISRA-C:1998. Looking ahead, Analox plans to move to MISRA-C:2004 for all projects with a safety requirement.
- Test case generation — Analox wanted to quickly and efficiently generate a large number of focussed test cases and identified that TBeXtreme was uniquely placed to provide this key element of their intended test process.
- Code assessment metrics — To improve their systems, Analox focused on:
  - Clarity — How easy is our system to understand?
  - Maintainability — How easy is it to maintain our software?
  - Testability — How much effort is needed to test our system?

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“Not only did LDRA offer superior standard compliance and test generation,” noted Chris Allen, Design Engineer, Analox, “but LDRA was also the only product able to integrate successfully with the Analox tool chain, an integration smoothly carried out by the LDRA application engineering team.”

## Technical Requirements

When put to the test, LDRA excelled beyond the competition on a number of fronts.

- The high degree of automation provided by TBrn and TBeXtreme was a key element. The automatic test and stub generation ensured that Analox could gain IEC 61508 compliance without the tremendous time and resources typically needed for such activities.
- The LDRA tool suite provided Static Analysis that ensured Analox maintained best practise. In addition Analox could tailor the MISRA rules for their application easily and monitor coding compliance at all times.
- Analox was able to utilise the extensive Dynamic Analysis facilities of the LDRA tool suite in support of their requirement for functional testing and complete code coverage. In so doing Analox was able to review, test and re-examine code quickly and effectively to maximum benefit.

## The Benefits

“LDRA has changed the way Analox carries out testing,” confirmed Allen. “By providing Analox with a best-practise methodology, we’ve been able to increase productivity and quality while reducing costs.”

## The Future

In light of the positive experiences and obvious benefits to date, Analox plans to ramp up the use of the LDRA tool suite for all projects with a safety requirement. As part of this extended use, with the recent release of IEC 61508:2010, Analox will be working towards certification for future safety related projects.

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