



CREATING A "CULTURE OF SAFETY" THE 2008 IADC SAFETY AWARD

Paraphrasing an old adage, one might say: "Safety is its own reward". And indeed it is. Thorough training, compliance with international ISO and other standards, vigilance regarding quality and health, safety and environment (QHSE) results in less on-the-job downtime, fewer accidents, healthier employees, improved performance and the delivery of quality projects.

Recognising the positive impact that overall safety can have for a project, for the client and for the contractor, in 2007 the International Association of Dredging Companies (IADC) decided to present its own reward for the exceptional safety performance of a member company,



Figure 1. An aerial overview of the Australian Marine Complex site in Jervoise Bay, Western Australia.

project or ship by issuing an annual award for outstanding achievement. Through the IADC Safety Award the organisation hopes "to encourage the development of safety skills on the job and to reward those people and companies demonstrating special diligence in safety awareness in the performance of their profession".

2008 AWARD WINNING PROJECT

Last year Flanders Dredging Corporation N.V. (FDC), a 100 percent subsidiary of Jan De Nul Group, completed a project at the Australian Marine Complex (AMC) located in Jervoise Bay, Western Australia (Figure 1). The project was highly commended for outstanding achievements by the client's project manager, both on Occupational Safety and Health as well as Environmental Management.

Working in Australia is demanding on many levels, and certainly the contractor's QHSE

Above: The cutter suction dredger *Leonardo da Vinci* at work at the Australian Marine Complex. Work for a floating dock was completed with zero non-compliances and no lost-time injuries.

management systems were under close scrutiny by government and labour unions. If QHSE were not given the priority it demands then some form of action certainly would ensue. Considering the stringency of these requirements, recognition by the client, the Department of Housing and Works of Western Australia, of FDC's efforts was most notable and appreciated.

After careful examination of all the entries, the IADC Board of Directors concurred as well that the safety standards maintained at the "Australian Marine Complex Dredging Works for a Floating Dock" and the dedication of staff and crew to safety management were clearly deserving of special recognition.

The Dredging Works

The dredging works for a floating dock took place at the AMC Common User Facility (CUF) in Fremantle, Australia (Figures 2 and 3). The works comprised dredging a pocket of 65 m x 250 m to -17.7 m CD to accommodate a floating dock at the AMC ship repair facilities. The works were performed by the cutter suction dredger (CSD) *Leonardo da Vinci* which excavated about 100,000 m³. All dredged materials had to be placed in onshore containment areas.

The main operational problem faced during the dredging was the confined working area as the ship lift pocket was located near two existing commercial berths.

The tail water of the reclamation was discharged into the southern part of the Cockburn Sound Harbour after being decanted in a settlement pond. To pump the tail water from the reclamation area to the settlement pond, four Van Heck pumps were installed (Figures 4 and 5).

The dredging works took only 12 days, and the preparation of the reclamation area and settlement ponds took two months, from May to early July 2007. Even though the project was completed in a relatively short timeframe, the client organised three external audits. During these audits, zero non-compliances were reported. In addition, the project was executed without a single "lost-time injury".

The Preparation Phase

During the preparation phase the following safety actions were taken:

- all documents describing the QHSE management systems were set up.
- Western Australian (WA) regulations were studied and implemented based on the contractor's previous job experience on projects in Port Hedland for two other clients.
- Hazard Identification (HAZID) meeting with all operational staff was conducted well in advance at Port Hedland to identify the hazards and environmental aspects of the works at AMC CUF.
- Kick-off meetings were held with the main crew of the CSD *Leonard da Vinci* and with the main sub-contractors, during which the main risks/impacts and the control measures and lines of communication with internal and external parties were discussed.

As a requirement of the contract of these works, FDC had to provide and implement a comprehensive safety and health manual as well as a safety and healthy quality plan. Both these documents were reviewed by the Department of Housing and Works Occupational Safety and Health auditor and both achieved full compliance with the con-

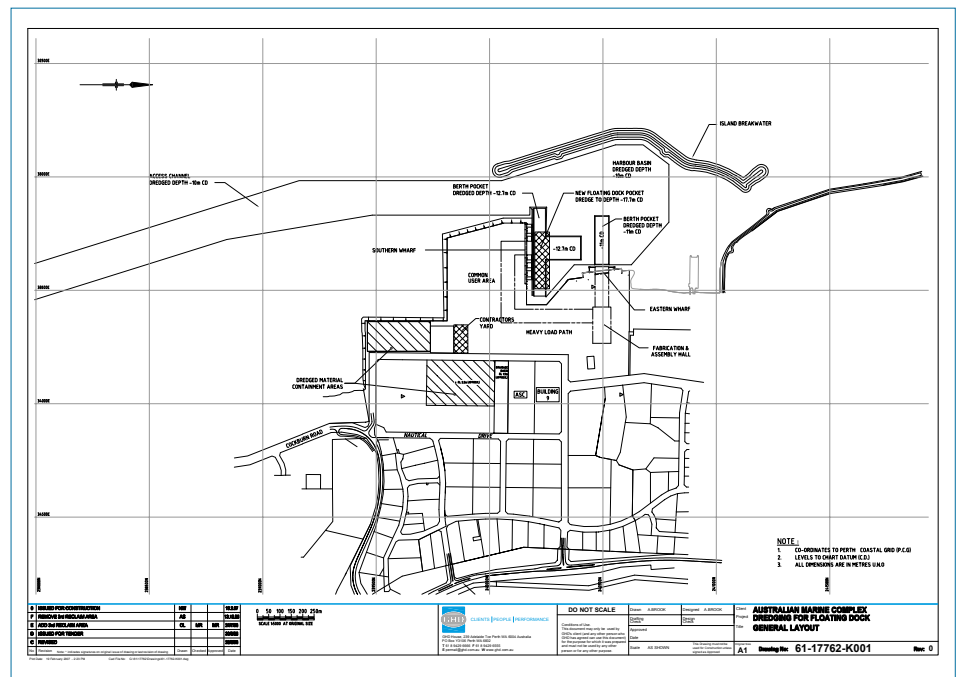


Figure 2. The general layout for AMC dredging for a floating dock.

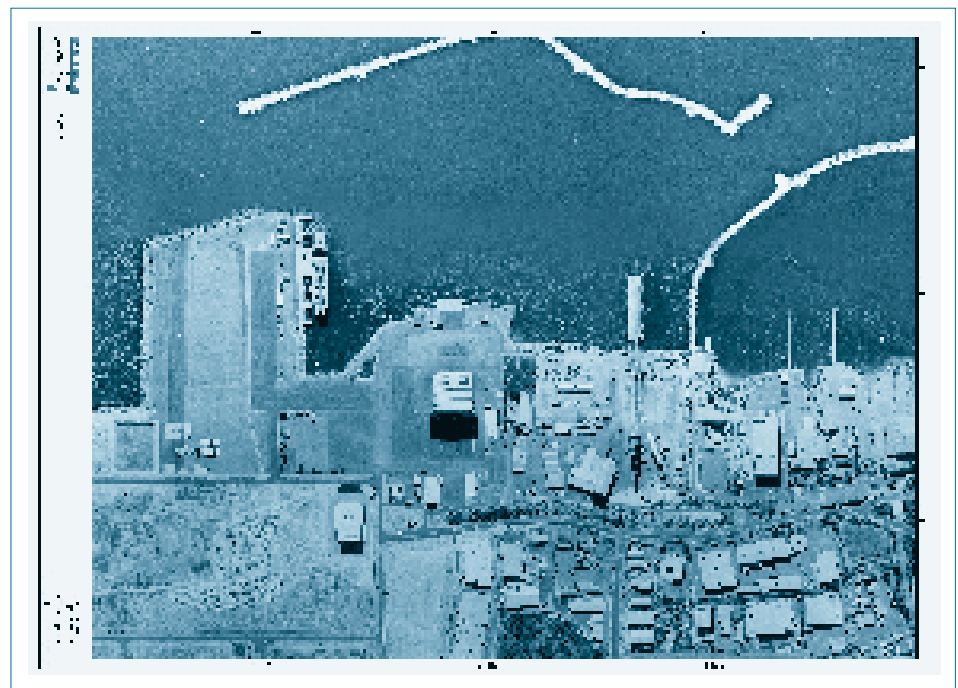


Figure 3. Aerial picture of whole AMC site with at the left the location for the future ship lift.

tract requirements for safety management. The success of the Environmental Management system was largely a result of the design and set up of the reclamation area and settlement ponds (Figures 6, 7 and 8). Contractually the Contractor was responsible for preparing the Dredge Management Plan and to seek approval of

it from both the Department of Environment and Conservation and the Department of Fisheries. Approval from both departments was secured well in advance of the arrival of the dredger.

Occupational Safety and Health

The total working time for this project was



Figure 4. Four Van Heck pumps were used to pump the tail water from the reclamation area into the settlement pond.



Figure 5. Another view of the Van Heck pumps from the reclamation area.

29,000 hours and the project was completed with zero lost-time injuries, which was certainly a result of the emphasis put on quality and health, safety and environment (QHSE). A brief review of the efforts made illuminates this attention to detail and the commitment to QHSE.

The project was audited three times by an external entity appointed by the Client:

- Occupational Safety and Health Suitability Audit (April 2007)

- Occupational Safety and Health Compliance Audit (June 2007)
- Site Safety Survey Report (July 2007)

No non-conformities were registered during these audits. On the project itself an ISM / ISPS audit was also undertaken.

The QHSE staff comprised no fewer than 5 people who conducted more than 300 project inductions, including those for visitors from the head office; more than

350 pre-start meetings were conducted at the start of every shift; and more than 40 toolbox meetings were held on a regular basis covering a fixed topic or one related to an incident.

Two safety committee meetings were held onboard the CSD. Besides job specific standard training, external trainings for Fire Wardens were performed. Drills were performed as per ISM requirements.

In addition, a HAZID meeting was also held. HAZID is a formal and systematic examination of the planned work activities related to the project, the process and the contract. The HAZID technique is used to identify the potential occurrence of hazardous events and their impact on people, property or the environment, or operational challenges and their impact on process efficiency or productivity. The technique is based on the premise that a hazard will not be realised if the process is always operated within its design and planned intent. Responsibilities and planned due dates are also defined.

Another objective of HAZID is to identify controls that may be required to reduce potential risks and hazards. Hazards identified were:

- interference with third parties, onshore and marine;
- neighbouring blasting operations; and
- manoeuvring with floating equipment.

Daily safety rounds and weekly (internal) site inspections were held throughout the course of the project. When concerns were observed they were subsequently raised and addressed and discussed with the relevant supervisors.

Personal Protective Equipment (PPE) (Figure 9) is an important part of worker safety and can include face shields, safety glasses, hard hats, and safety shoes. In addition to the PPE that had previously been purchased to protect employees from serious workplace injuries or illnesses or other workplace hazards, further PPE was purchased including high-visibility vests, high-visibility fleeces, and raincoats and trousers.



Figure 6. Preparations of the reclamation area and the initial settlement pond.



Figure 7. View of the main settlement pond.

Of course, inevitably, some events were encountered in the course of the operations. In total, 37 “hazard observations” (known as events) occurred. Of these, 15 were “yellow” events and 22 “green” events, in which, according to FDC’s risk and impact matrix, yellow is classified as of medium significance and green as of low significance. None of the events were classified as high significance (red). All these events were investigated and addressed in a timely fashion (Figure 10).

Taken as lessons learnt, corrective and preventative actions are being applied. For instance, based on analyses, more than 80 percent of events are caused by employees themselves. As a result of this analysis, additional attention is being spent to the technical competency and physical fitness of all personnel.

Environmental Monitoring and Management

The Cockburn Sound area contains sensitive sea grass meadows with the main species growing there being *Posidonia australis* and *P. sinuosa*. Their preservation was obviously a priority. Measures to protect these species consisted of monitoring both the water quality and the sea grass.

Figure 8. The settlement pond showing water quality monitoring and equipment (left) and silt screen in the middle.



Figure 9. Crew members with Personal Protective Equipment (PPE), an essential element in ensuring proper occupational and safety standards.

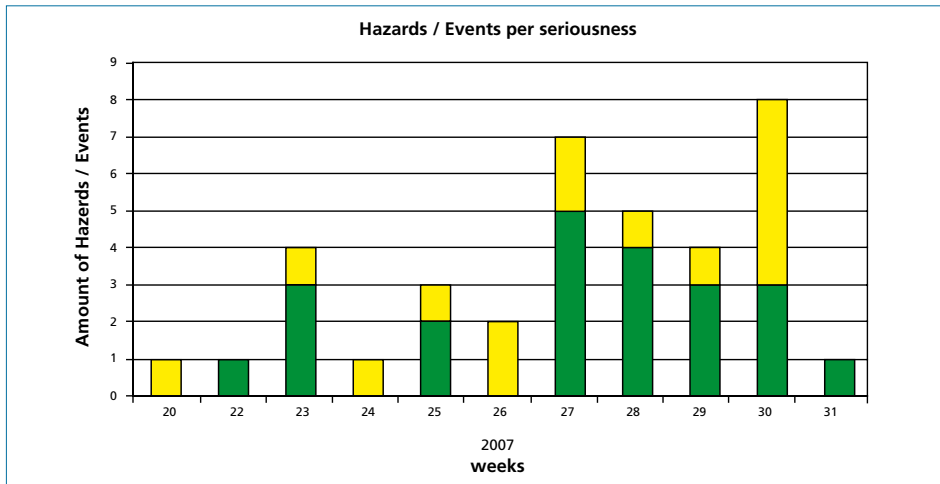


Figure 10. Hazards / Events per seriousness: Yellow indicates medium significant events. Green indicates events of low significance.



Figure 11. To protect the indigenous sea grass, turbidity monitoring took place at 12 strategic points.

Water quality monitoring

Dredged material was composed of calcareous material and pumped ashore into a reclamation area 300 m x 200 m. Process water running off the reclamation was pumped by four pumps into a small settlement area 80 m x 200 m and continuously discharged through a weir box in the Cockburn Sound Harbour. Monitoring of water parameters, such as the turbidity created by the dredging action and from return water leaving the settling basin took place during the works at an agreed distance to ensure that the impact on the environment was minimised.

The turbidity sensors (type Hydrolab DS 5X) gave readings in NTU (Nephelometric Turbidity Unit). An automated, solar

powered, real-time monitoring system with radio telemetry to a base station was installed at the weir boxes for long-term deployment. Data was sent to the office, where it was processed and analysed by specialised software, so that anomalies could be detected instantly.

Sea grass monitoring

A sea grass monitoring programme was started to avoid the decrease in light penetration and resettlement of dredge sediment, which could be fatal to underlying habitats.

A baseline assessment of sea grass was conducted prior to the dredging works to quantify and qualify the sea grass meadows.

Sea grass health was determined via measurements of shoot and leaf density by an independent environmental consultant. Twelve strategic points were chosen to monitor the turbidity (NTU), totals suspended solids (TSS) and light penetration depths (Secchi disk) and these were used to provide information about the turbidity during the dredging works (Figure 11). No exceedances were recorded during the entire execution of the project.

CONCLUSION

As a result of the successful completion of this project, the Jan De Nul Group has been asked to commence in August 2008 with the next phase of the expansion works in Port Hedland, also in Western Australia. To prepare for these works the CSD *Leonardo Da Vinci* and the Multi-Cat DN-30 are being refurbished and rebuilt, with modifications and improvements which will enhance even further their safety features.

Such ongoing attention to detail in quality and health, safety and environment by management, staff and crew is a sure way to continue to sustain a “culture of safety”. This dedication results in a safe work environment for all personnel which helps to ensure the successful completion of dredging works according to the Client’s specifications.

Through the presentation of the 2008 IADC Safety Award to this project at the Australian Marine Complex, the IADC as the representative of the private dredging industry hopes to express the high regard that its members have for the health and safety of personnel, for the environment and for standards of quality on all aspects of the job.