

Martin Zwanenburg

# The Exploitation of Cockle Shells



Figure 1. Cockle fishing ship and draghead.

## AWARDS PRESENTATION

At the CEDA Dredging Days held in November 2003, an IADC Young Authors Award was presented to Martin Zwanenburg for his paper 'The Exploitation of Cockle Shells'.

During the presentation at the closing ceremony of the conference, IADC Secretary General Constantijn Dolmans noted, "Innovation in finding dredging

solutions is of the utmost importance. It is a goal that all IADC member companies strive for. We encourage such innovation within our industry, and certainly in the up and coming generation of young researchers. Since research is an integral part of the competitive process, looking outside of the traditional dredging industry can be just as important as looking within. Wherever useful ideas originate, the ultimate aim of dredging is to ensure the expansion of prosperity, with due respect for environmental issues. Dredging plays a significant role in the search for sustainable economic development and papers such as this one are part of the process of stimulating further research and attaining this goal".

## IADC Award 2003

**Presented at CEDA Dredging Days,  
Amsterdam, The Netherlands  
November 20-21 2003**

The theme of the 2003 CEDA Dredging Days conference held in conjunction with the Europort in Amsterdam was "Specialist Dredging Techniques, Inspiring Dredging Solutions". As is customary the IADC at the recommendation of the CEDA Paper Committee presents an award to the best paper written by a younger author. This year the Paper Committee selected Mr. Martin Zwanenburg for his research entitled "The Exploitation of Cockle Shells". Mr. Zwanenburg, who works for the shipbuilder IHC Holland, was supported in his study by Mr. J.D. Holstein of the Dutch Producers Organisation Cockle Fishermen of The Netherlands and professors S.A. Miedema and W.J. Vlasblom of University of Technology Delft.

## BACKGROUND OF THE PAPER

The cockle, which is considered a delicacy in southern European countries, is dredged up by specialised cockle ships. However, the dredging of the cockles leaves tracks on the seabed, resulting in negative public opinion toward the cockle branch. A reduction of these tracks, together with a reduction of the required power and an improvement in cockle quality is desired. The Dutch Producers Organisation of Cockle Fishermen decided to investigate the possibilities of adapting the current design of the cockle-dredging draghead. The research was done at the University of Technology Delft, The Netherlands, Department of Mechanical Engineering.

## The cockle draghead

The cockles are fished with special ships equipped with an installation which looks in some respect like the

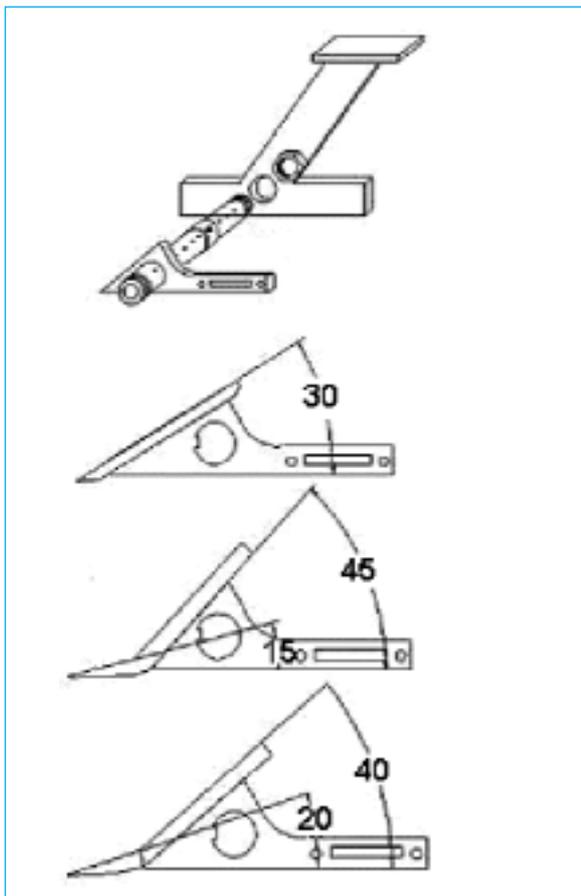


Figure 2. Configurations of the serrated knives.

dredging installation on a trailer suction hopper dredger (Figure 1). Via the dredging head, cockles and sand are sucked up and transported to a separation drum on board the ship, in which the sand is separated from the cockles.

The cockles are kept on board and the sand and water are drained back to the sea. Several scientific studies have determined that there are no irreversible effects to the seabed, however, because of other negative opinions, the decision was still made to conduct further investigations.

The current design of the cockle draghead was developed at the end of the 1970s and made for high production and high sailing speeds. The dimensions of the cockle draghead differ for each ship, but the width of the blade is determined by the law by the department of Agriculture and Fishery. The current blade is adjustable bin depth and cutting angle.

After completely examining the of the cockle draghead, it became clear that the use of jet water causes the depth of the tracks. Reducing the jet water is not possible in the current draghead design because the pulling forces are too high. From the flow pattern inside the cockle draghead, it is clear that the sand which is brought up by the blade does not resettle after the

draghead passes, but instead is sucked up. To achieve improvements the jet water should be minimised and, if possible, the sand that is brought up by the blade should be reduced. For this reason the investigation focussed on the design of the blade in order to achieve the required improvements and minimise tracking on the seabed.

### Serrated knives

Several configurations of serrated knives were tested to investigate whether or not it is possible to pick up the cockles, whilst leaving the sand at the bottom. An unexpected difficulty was the phenomenon that, in some configurations, the teeth are blocked by the sand which then pushes the sand forward like a bulldozer blade (Figure 2).

The best results were obtained by a serrated knife consisting of straight round bars, connected to each other at the back end, thus achieving an optimum flow through the serrated knife, with no use of jet water. Though the laboratory results were satisfying, practical application not yet been determined. Extensive tests on site are still required to determine the possibilities for using serrated knives in cockle dragheads.

The entire text of this paper can be found in the *Proceedings of the CEDA Dredging Days*, November 20-21 2003, Amsterdam.

## Two IADC Young Authors Awards in 2003

Each year, at selected conferences and at other appropriate occasions, the International Association of Dredging Companies grants awards for the best papers written by authors younger than 35 years of age. At each appointed conference or occasion, the Paper Committee is asked to recommend a prizewinner whose paper makes a significant contribution to the literature on dredging and related fields. The purpose of the IADC Award programme is "to stimulate the promotion of new ideas and encourage younger men and women in the dredging industry". The winner of an IADC Award receives *US\$ 1000* and a certificate of recognition, and the paper if suitable is then published in *Terra et Aqua*.

In 2003 two such awards were presented. In September one was presented at the COPEDEC VI held at Colombo, Sri Lanka (see page 14). The second was presented last November at the CEDA Dredging Days in Amsterdam (See opposite page).