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GT/BI.

6th September, 1957.

Professor W.R. Hawthorne,  
Cambridge University,  
CAMBRIDGE;

Dear Sir,

We were very interested to read the account of the nylon "massage skin" containers which you hope will be the answer to Britain's need for cheap oil transport from the Middle East and we would be very grateful to have an opportunity of taking a film for the Newareel when the full size prototype is ready.

We hope that you will be able to help us and that you will bear this request in mind.

Thanking you.

Yours faithfully,  
ASSOCIATED BRITISH-PATHE LTD;

GRACE FIELD;  
NEWS EDITOR;  
PATHE NEWS;

18 - 9. 58

# NATIONAL RESEARCH DEVELOPMENT CORPORATION

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1 TILNEY STREET,  
LONDON W. 1

TELEPHONE: GROSVENOR 5431  
TELEGRAMS: NARDEC AUDLEY LONDON

9th September, 1958.

YOUR REF: **CF/EN**

OUR REF: **BJAB/KE**

**News Editor,  
Pathe News.**

**Dear Madam,**                      Towing of Oil in Flexible Barges

I have much pleasure in inviting a representative of your journal to attend a special demonstration of the flexible barge (Dracone) invented by Professor W.R. Hawthorne F.R.S. and his associates of Cambridge University and developed by Dracone Developments Ltd. with the assistance of the National Research Development Corporation.

This press demonstration will be held on Thursday, 18th September, 1958 at Southampton Water beginning at about noon and continuing until about 3 o'clock in the afternoon. The barge in question is 100 ft. long with a content of some 40 tons.

The press party will assemble at No. 3 Pontoon Landing Stage next to Hythe Ferry, Town Quay, Southampton at about mid-day. This pier is opposite the southern end of Southampton High Street and car parking facilities are available near the quayside. There is a train leaving Waterloo at 10.30 a.m. arriving at 11.51 a.m. at Southampton Central. The Town Quay is about a mile away from the station and can best be reached by taxi. A launch "Accordance" will be waiting at the Quay and will sail shortly after 12 noon.

The trials will be followed from this launch and the programme will include a visit to the company's facilities at Marchwood in the course of the afternoon. A buffet lunch will be served aboard the "Accordance".

I should appreciate learning from you as soon as possible, and not later than the first post on Tuesday, 16th September, whether or not your representative will be attending. I attach a reply card for this purpose. I should add that there is no objection to photographs being taken. Please telephone me if you have any queries.

Yours sincerely,

*B. J. A. Bard.*

P.S. This project is one of the Corporation's newer projects. In our last published Annual Report (for the year ending June, 1957) we commented as follows:-

"The Corporation has given financial support to a group at Cambridge University, headed by Professor W.R. Hawthorne, who have been engaged on theoretical and practical studies of the stability of towed flexible oil barges and of methods of preventing their tendency to snake. A number of tests have been carried out on filled prototypes towed in the Ouse at Ely and in the sea at Felixstowc. These tests confirm the theoretical studies and it is believed that a flexible barge can be designed which will be stable when towed."

PRESS HAND-OUT

NATIONAL RESEARCH DEVELOPMENT CORPORATION

DEMONSTRATION OF FLEXIBLE OIL BARGE (DRAZONE)

SOUTHAMPTON, 18TH SEPTEMBER, 1958

1. Introduction

The National Research Development Corporation and Messrs. Drazone Developments Ltd take great pleasure in welcoming representatives of the press to a special demonstration on Southampton Water today. This is believed to be the first public demonstration in the world of a flexible barge depending for its mechanical strength entirely on fabric and actually carrying a cargo of petroleum oil.

The accompanying brochure will tell you briefly the history and aspirations of this project. The Drazone to be demonstrated today is five feet in diameter and one hundred feet long with a capacity of 10,000 gallons (approximately 40 tons) and it contains a cargo of kerosene of specific gravity 0.796. The Drazone is made of woven nylon fabric with synthetic rubber coatings inside and out capable of resisting petrol or fuel oil on the inside and sea water and sunlight on the outside. We will let you have a small specimen of this material before you depart today. (see paragraph 4 - Technical Note for fuller details).

This barge was manufactured to the special order and design of the Drazone Company by Messrs. P.B. Cow & Co. Ltd, whose co-operation is gratefully acknowledged. It should be emphasised that this project is entirely British - conceived, designed and executed. It is believed that "Drazone D.1" is the only flexible barge in existence capable of carrying for long periods a cargo of kerosene or other mineral oils and, moreover, for doing so in rough water. This barge has already been afloat for more than five hundred hours.

2. Programme of Tests

The Drazone (Drazone D.1) will be shown being towed by a conventional 60 H.P. launch at speeds ranging up to  $5\frac{1}{2}$  knots. A fairly short towline will be used, and it will be attached to a spring balance indicating the towing resistance of the barge.

Turning at various speeds will be performed and it will be shown how the Drazone kinks to follow the launch, thereby giving manoeuvrability even in a crowded waterway. The Drazone will then be towed back to its base which is at the 17th Port Training Regiment R.E., Marchwood, Southampton, where facilities have been rented to the Corporation by kind permission of the War Office and the Officer Commanding (It is requested that no photographs of Military property should be taken). At the base, the Drazone will be emptied and wound up on a floating reel. The cargo will be discharged into a small tanker, the Esso Parkgate, of approximately the same capacity as the barge.

Opportunities will be given to inspect the material of which the barge is constructed, and to see photographs of the tests of the Drazone, and of existing tests with models. Some of these models designed to carry alcohol will be on demonstration at the base: these include models 9" in diameter, and also Draconella, a model 3' in diameter and 67' long, weighing 200 lb, and which carried 10 tons of alcohol during the research tests performed by the Engineering Laboratory at Cambridge in the early part of last year.

3. Arrangements

Lt. Col. H.G. Hasler D.S.O., O.B.E., R.M. (Rtd) is in charge of the trials. Requests for special opportunities to take photographs should be addressed to Col. Hasler.

Lunch etc. will be served on board during the towing demonstrations.

Throughout the demonstration representatives of N.R.D.C. and Drazone Developments Ltd will be happy to be of assistance to the press. It is hoped to be able to arrange a more formal question period in the afternoon.

Representatives receiving the press party will include:-

Professor W.R. Hawthorne F.R.S.	Professor of Applied Thermodynamics, Department of Engineering, Cambridge University. Chairman of Dracone Developments Ltd.
Mr. J.C.S. Shaw M.A.	Lecturer, Department of Engineering, Cambridge University. Director of Dracone Developments Ltd.
Dr. B.J.A. Bard D.I.C.	Member of the National Research Development Corporation. Vice-Chairman of Dracone Developments Ltd.
Lt. Col. H.G. Hasler D.S.O., O.B.E., R.M. (Rtd.)	Officer in charge of operational trials and demonstration arrangements.  Consultant to Dracone Developments Ltd.  (Col. Hasler was the leader of the 1942 expedition which was portrayed in the film "Cockleshell Heroes").
Sir Geoffrey I. Taylor F.R.S.	Cavendish Laboratory, Cambridge University.  Director of Dracone Developments Ltd.
Mr. H.J. Lincoln	Development Manager, Dracone Developments Ltd, Appleyard-Lincoln Boatyard, Ely.
Mr. T.A. Coombs ) Mr. H.K. Turner )	National Research Development Corporation.  Dracone Developments Ltd.

#### 4. Technical Details

##### (a) Description of Barge

Length 100 feet. Diameter 5 feet. Faired ends with towing and hose pipe connections at nose and stern respectively. Cargo 10,400 gallons of kerosene (paraffin) of specific gravity 0.796 weighing 37 tons. The barge has also carried 45 tons of fresh water. There is no air space - the Dracone is entirely filled with cargo.

A "stressed skin" construction is used. The skin, which is  $5/32$ " thick, consists of a woven nylon fabric, with synthetic rubber coatings inside and out. The skin of the Dracone contains just over 200 lb. of nylon which gives it high mechanical strength. Its total weight is 2300 lb.; most of the weight is in the rubber which has to seal the fabric and provide abrasion resistance. Eyes are fitted at nose and stern for attaching ropes for towing and mooring, for buoys and floats with flags and navigation lights. At the stern there is an Avery Hardcell self-sealing, quick-acting hose connection for emptying and filling through a 4" hose. Connections for measuring internal pressure are also provided. A special stabilising device has been attached to the stern. Without this device the barge would snake and yaw from side to side.

The reel used for carrying the wrapped-up barge is a squirrel cage 9' long and 5' in diameter. A floating reel which will be used in the demonstration has internal buoyancy tanks at each end of the squirrel cage of aluminium tubes.

The nose of the barge is drawn through the bars of the squirrel cage just as the end of a film is inserted through a slit in the drum of its reel.

Reels carrying wrapped-up Dracones can be transported in boats, trains, or by lorries. The reel mounted in a boat, which will be shown, has deliberately been made of the simplest materials assembled in a relatively crude fashion. The Dracone can be reeled on to the boat reel while emptying or spooled from one reel to the other at any time. The reeling up is done by one man with a hand winch.

For long journeys, for instance by air, the Dracone can be folded into a lorry or packing-case and the reel dismantled so that a compact package is obtained.

The Dracone will carry any liquid lighter than water. With petroleum oil 15% to 20% of its volume shows above water; with fresh water the barge is almost fully immersed.

To empty or fill the barge with the pumping equipment used in the demonstration takes about one hour. More powerful types of pump, as used for emptying tankers at Fawley, will reduce the time to about twelve minutes.

#### (b) Further Plans

Demonstrations to interested organisations and departments are taking place every Tuesday and Thursday during September. Commercial operational trials of barges of this size are next on the programme. Cargoes will be carried under realistic conditions in inland waterways here and abroad with the co-operation of interested organisations.

A manufacturing schedule for Dracones of the size shown has been prepared and a second similar barge is already under construction.

Materials and designs for the manufacture of a 200' long Dracone 10' in diameter, with a capacity of about 300 tons have been prepared.

Plans are also being prepared for early trials at sea with the 40 ton barge. These tests will be fully instrumented. Research tests on models in waves have already been undertaken.

#### 5. National Research Development Corporation

The National Research Development Corporation was set up by the Board of Trade under the Development of Inventions Act, 1948, to secure, where the public interest so requires, the development or exploitation (a) of inventions resulting from public research, and (b) of any other invention which is not in the Corporation's opinion being sufficiently developed or exploited.

The Corporation submits a report each year to Parliament which is subsequently published.

Its Chairman is Sir William Black and its Managing Director the Rt. Hon. the Earl of Halsbury.

National Research Development Corporation,  
1, Tilney Street, Park Lane, London W.1.

(Telephone Grosvenor 5431)

Dracone Developments Ltd,  
7, Tilney Street, Park Lane, London W.1.