

Port of Emden

PART I

# THEORETICAL AND OBSERVED WAVE CHARACTERISTICS Small Island during Storm Tide



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### **CHAPTER 1**

### A WORLD WAVE DATA CENTRE

by

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## ABSTRACT

There is a growing need for instrumentally-measured wave data, but it is not easy to discover what measurements, if any, may have been made in any particular area. To try to alleviate the situation the Institute of Oceanographic Sciences is establishing an international reference centre which will create and maintain an inventory of such data. It is appealing for volunteers world-wide to help in identifing locations where waves have been measured.

It will be operated through the U.K. Marine Information and Advisory Service at the Wormley Laboratory of the Institute.

The birth of wave recording can be assumed to have occurred during the Second World War, prompted by the need to land through surf on unfamiliar beaches and assisted by the developments in electronics which allowed the complexities of wave motion to be monitored at a distance. After peace returned, the applications of the new capability to coastal engineering were soon appreciated and instruments began to be deployed on many coasts of the world. The demand for data far exceeded the supply, and research The laboratories, both engineering and oceanographic, found themselves being asked to advise on wave conditions, provide and interpret measured data and, where none existed, to predict wave conditions for both design and operational needs. Amongst the laboratories which responded to the need was the UK Institute of Oceanographic Sciences (known previously as the National Institute of Oceanography) which designed and built wave recording instruments, installed them around the UK and elsewhere, developed methods of analysis and data presentation and built up an index of sources of instrumentally-measured wave data. This index, along with the expertise built up within the Institute and elsewhere, meant that the Institute became a focus for questions on data

sources and advice on all aspects of waves, a large proportion of the questions coming from engineers working on coastal and also on offshore installations.

About ten years ago the Permanent International Association of Navigation Congresses (PIANC) established its International Waves Commission on which the author sat for a time as the UK Representative, under the Chairmanship of Professor J. Larras. It compiled a list containing brief but relevant details supplied by its members of instrumentally-measured wave data, and developed a system whereby the owners of such data could be identified through a network of area representatives. Each representative, on identifying a source of wave data, would obtain answers to a set of standard questions so that any potential additional user could quickly ascertain whether or not the measured wave data would be likely to be of value to him. It would also be possible to compare the characteristics of different data sources. It was originally intended that these completed questionnaire forms would then be sent to the Commission to allow the central inventory to be established and continually updated. Unfortunately, after devising the scheme, PIANC was unable to establish an ongoing unit to operate it. Meanwhile, the amount of data being measured continued to increase as did the demand, but the potential value of wave data was being lost because the measurements were not known to later potential users, simply because there was no organization responsible for cataloguing even their existence, and wave conditions were needing to be re-measured unnecessarily.

The questionnaire form was developed further, under the chairmanship of Dr. J.R. Wilson, by the Task Team on Wave Data Management of the Intergovernmental Oceanographic Commission (IOC). The Institute of Oceanographic Sciences then made an offer to IOC to become a Responsible National Oceanographic Centre for Waves (RNODC(Waves)). The intention is that the Marine Information and Advisory Service will operate the PIANC scheme, and establish the RNODC(Waves) as an operational centre which will attempt to identify all sources of instrumentally-measured wave data through an The wave international network of area representatives. data questionnaire has evolved as a consequence of limited experimental use so far. It can form the basis of an experimental use so far. Inventory to be used in satisfying the needs of a potential wave data user to identify suitable sources.

There is a demand for copies of this Wave Data Inventory but in its present form it is not practical to distribute it on account of its bulk. However, it is proposed to compile a Wave Data Catalogue in which the essential minimum information from the Inventory is condensed. This will constitute the working document within the RNODC (Waves). A number of people around the world, active in

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#### RESPONSIBLE NATIONAL OCEANOGRAPHIC DATA CENTRE (WAVES)

Marine Information and Advisory Service of the Institute of Oceanographic Sciences of U.K. in association with the Permanent International Association of Navigation Congresses (PIANC), I.O.C. Working Committee on International Oceanographic Data Exchange

#### INSTRUMENTAL WAVE DATA INFORMATION

for inventory purposes or to accompany submission of data.

PART	I : IDENTIFICATION OF DATA
1.1	Source responsible for the data and from whom the data or further information may be obtained. Name Organization Address
1,2	Name and Position of wave measurement site (or cruise/flight identifiers including start/end dates).
1.3	Start and End dates of Wave Heasurements (ignore temporary breakdowns). Start d /m /v
	End d /m /y
1.4	Other information which may be necessary to identify this data.

PART I should always be completed and, where no data is transmitted, PART II represents the essential minimum of additional information required for INVENTORY PURPOSES. When the form accompanies data, it is essential that sufficient information is provided to fully qualify the data for future users. Where convenient, entries may be replaced by references to other documents forwarded either with this form or previous forms. Hetric units are preferred. If the space allowed is not adequate please use additional pages.

Return this completed form to :

(1) (name)

Address :

or (2) If (1) has not been completed, to :

RNODC(Waves) MIAS, 10S, WORMLEY, GODALMING, SURREY, GU8 5UB, U.K.

(Jan, 78)

# Inventory form, first page.

the engineering aspects of waves and who have a direct interest in knowing of the existence, and quality, of instrumentally-measured wave data, have expressed a willingness to participate in the scheme as Area Representatives. The response to informal approaches has been encouraging, but more offers will be welcomed. It is proposed to leave the appointment of Area Representatives until after this conference, when a list of appointees will be compiled and published. An area representative will be a person active in this field who could obtain the backing of  $\tilde{h}\textsc{is}$  establishment to run an effective search and identify mission, or even the establishment itself, provided that a dedicated individual would take responsibility for operations. It is a responsible and rewarding task, hopefully not too onerous, which will contribute significantly to engineering operations in the world. It does not seem that either the RNODC(Waves) or UNESCO will be able to provide funds extern-ally for the running of the scheme, but it is planned that RNODC(Waves) will supply each Area Representative with questionnaire forms, a copy of the Catalogue and occasional up-date material. He will also maintain his own inventory of completed questionnaire forms relevant to his area. The four-page questionnaire form is illustrated in the figure. It consists of one sheet of paper folded to A4 size. The questions are arranged so that answers can be stored for computer retrieval. The RNODC(Waves) will provide anyone with advice on wave data measurements, analysis, interpretation and presentation, as well as reports on the data themselves if copies are available to the RNODC(Waves).

Although the early response to the appeal for Area Representatives has been excellent and the scheme is starting with good coverage, offers of participation will be welcomed at any time. In any one country it is likely that there will be a primary representative person or organization, so that additional participants will be asked to channel their completed forms through the primary representative for their areas. For example, it is likely that all U.S. participants will be asked to forward their forms to Mr. Wellington Waters of the USNODC in Washington for onward transmission to the RNODC(Waves).

It is hoped that the establishment of an effective RNODC(Waves) will be of appreciable communal benefit and will tidy up what is at present an active but only partially effective operation. It seems likely that it will be an on-going scheme dedicated to helping anyone working in an area affected by waves, whether in the building of structures intended to provide protection from them, the operation of vehicles through them, the abstraction of energy from them or in many other activities where waves have to be taken into account.

. 1	Report Title (if published).		
. 2	Description of Neasurement Site.	2.3	Description of Measurements.
a)	Sea Area	a)	Type of instrument (e.g. waverider, resistance staff, pressure gauge, altimeter, etc.)
ь)	Latitude and Longitude (express as range if necessary)	b)	Type of instrument mounting (e.g. ship, aircraft, tripod on sea bed, midwater mooring, etc.)
c)	Mean Water depth	c)	Digital sampling frequency
d)	Mean Tidal Range Spring	d)	Duration of individual records.
	Neap		
e)	Approximate maximum currents (if known).	e)	Interval between starts of successive records.
.4	Comment on presence of offshore bar whether or not their presence would	s, str make	uctures or obstructions, and the data untypical of the area.
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Inventory form, second page.

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PART	III : DATA DOCUMENTATION   IIIA - INSTRUMENTATION
3.1	Have you previously forwarded an inventory for this set of data? YES/NO.
3.2	Description of Instrument.
a)	Name of Instrument including Manufacturer and Model No.
b)	Pertinent physical characteristics (including modifications).
c)	Depth of sensors below, or height above, mean water level.
	Height of sensors above sea floor (if more appropriate).
d)	Recording Medium (e.g. strip chart, digital magnetic tape, analogue magnetic tape, etc.)
e)	Date and Method of calibrations (please state if not calibrated) and comment on stability of calibration.
f)	Steps taken to control biological fouling (if applicable).
3.3	Instrument Remarks (Specify operation failures during data collection, instrumental response characteristics, e.g. bandwidth and range, chart speed or other comments helpful in data interpretation).

Inventory form, third page.

PART III - a	continued.
IIIB -	DATA PROCESSSING
3.4 a) Type	of processing performed on data (e.g. spectral, Tucker-Draper, etc.)
b) ‼ain	start and end dates of processed data.
3.5 Remark.	s on Data Reduction and Processing. (Include any comments pertinent
to the	interpretation of the data, e.g. description of methods used in
derivi	ng parameters, corrections applied to the data, filtering performed
on the	data, etc.)
3.6 a) Are n	the data checked and edited? YES/NO.
b) What	criteria were used for the editing and quality assessment of the
data	?
3.7 General	l Remarks (Enter any other comments useful in interpretation and use
of data	a reported).
3.3 If tran	nsmitting data for the first time in computer compatible form please
append	a detailed description of its format and a detailed definition of
each da	ata field including units.

Inventory form, fourth page

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### ACKNOWLEDGEMENT

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# REFERENCE

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1973 Final Report of the International Commission for the study of Waves. Annexe No. 4 PIANC Bulletin No. 15, Vol. II.

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