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National Weather Service

A Survey of Marine Weather Requirements

HERBERT P. BENNER

Western Region

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NOAA TECHNICAL MEMORANDA
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WBTM 45/1 Precipitation Probabilities in the Western Region Associated with Winter 500-mb Map Types. Richard A. Augulis, December 1969. (PB-188248)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

NOAA Technical Memorandum NWSTM WR-68

A SURVEY OF MARINE WEATHER REQUIREMENTS

Herbert P. Benner
Marine Meteorologist
Western Region Headquarters
Salt Lake City, Utah



WESTERN REGION
TECHNICAL MEMORANDUM NO. 68

SALT LAKE CITY, UTAH
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A SURVEY OF MARINE WEATHER REQUIREMENTS (TRANS-OCEANIC VESSELS)

I. INTRODUCTION

With the establishment of the National Oceanic and Atmospheric Administration (NOAA) and the increased emphasis on marine weather services, the Western Region, in cooperation with the National Weather Service (NWS) Pacific Marine Office (PMO San Francisco), interviewed more than one hundred ships' officers regarding current weather services. These interviews were concerned with communications, packaging, and content of weather forecasts, warnings, and bulletins as well as soliciting suggestions for improved service. Through this means we hope to gain a better understanding of the needs of the mariner and reveal deficiencies in our current program. Hopefully these ideas will be incorporated into plans for new services in the future.

II. DATA COLLECTION

A simple questionnaire was prepared utilizing expertise of the Pacific Marine Office and the Weather Forecast Office at San Francisco (see Figure 1). The questionnaire was designed to be filled out by the visiting NWS Port Supervisor rather than a ship's officer. Experience in the past indicated that attempts to get ships' officers to fill out questionnaires yielded very poor results.

Questionnaires were distributed among Port Supervisors at San Francisco, Seattle, Los Angeles, Honolulu, and the Canal Zone. They were not completed for every ship visited but rather for selected representative ships, and where comprehensive interviews were most likely. Completed questionnaires were forwarded to Western Region Headquarters (WRH) for analysis and distribution to interested offices.

III. THE DATA

Data from the first 115 ships have been summarized in this report. Although data are still being collected, 115 was considered a fair representation of the user group.

In spite of the fact that questionnaires were completed by trained Port Supervisors, it was almost impossible to ask even the simplest question and still convey the same meaning to all ships' officers. This was a special problem when the officer interviewed was unfamiliar with the English language. The consequence was an occasional vague answer that seemed unrelated to the question. It was necessary in these cases to interpret the officer's meaning, and thus we may have inadvertently biased the answer. Certainly some subjectivity is reflected in the summarized data. Table 1 lists the number of ships from each country represented in interviews. Table 2 lists the number of ships by type represented in data sample.

IV. INTERPRETATION OF THE DATA

1. Do you receive weather information prior to departure? If so, where and how?

Ships' officers indicated a variety of methods to obtain predeparture weather information; however, answers can be summarized in the following general categories:

- a) Weather information was copied by ship's radio operator prior to the ship's departure.
- b) Predeparture weather was provided through a commercial, military, or company routing service.
- c) Ships' officers copied facsimile broadcasts and made their own interpretation.
- d) Contact, either direct or indirect, was made with the National Weather Service.

A detailed breakdown of answers to the question is:

Part One

Ships receiving briefings of some type -----	65%
Ships <u>not</u> receiving briefings of any type -----	33%
No answer -----	2%

Part Two

Predeparture information received by:

Routing service -----	20%
Radio (CW or Voice) -----	20%
VHF/FM (NWS broadcast) -----	4%
Facsimile charts -----	4%
Contact with NWS -----	7%
Type of briefing unknown -----	10%
No briefings -----	33%
No answer -----	2%

2. How are weather warnings and forecasts received aboard your vessel, e.g., radio CW or voice, radio fax, VHF/FM, commercial radio, Coast Guard, Navy?

All ships' officers interviewed indicated at least one form of communication was utilized for weather information with many indicating more than one. Type of communication and preferred broadcaster is biased by the ship's normal sailing routes and specific forecast requirements.

Number of types of communication for weather	Percent of Ships
1 -----	8%
2 -----	30%
3 -----	31%
4 -----	18%
5 -----	13%

Type of Broadcast Received	Percent of Ships
CW Radio -----	92%
Commercial Radio -----	71%
Coast Guard Radio -----	28%*
Navy Radio -----	57%*
Facsimile (Jap. - Navy) -----	23%
VHF/FM (NWS coastal) -----	16%*

*Obviously biased by route and user requirement.

3. What weather elements most affect your ship's operation?

Answers to this question fell into five categories of weather or sea conditions. These were wind, waves, fog, precipitation, and sea ice. In some cases it was difficult to differentiate between wind and waves since it appeared obvious that some officers relate the importance of sea state in terms of wind speed. In the following summary the category "unknown" includes "no answers" and answers that were vague or indefinite. When the officer indicated "fog" as an important factor, in almost every case the officer noted that fog was of concern in the "inshore areas". In general, waves were listed as 1st or 2nd in importance by 73% of the vessels. Wind was listed as 1st or 2nd by 69% of the vessels. Fog, in the "inshore" areas, was listed 1st or 2nd in importance by 26% of the vessels.

Weather or sea element listed as number one in importance:

Wind -----	46%
Waves -----	33%
Fog -----	11%
Precipitation -----	less than 1%*
Other indefinite -----	9%

Weather or sea element listed as number two in importance:

Wind -----	13%
Waves -----	40%
Fog -----	15%
Precipitation -----	less than 1%*
Sea Ice -----	2%

*Precipitation affected deck cargoes.

4. See 6 and 7.

5. What elements do you look for first in the bulletin?

The intent of this question was to determine what weather information is considered to be most important to ships' masters. Many officers gave more than one item for their answer and in these cases all answers are included in the listing below:

Position of lows -----	47%
Warnings -----	46%
Fog information -----	16%
Wind (observation) -----	14%
Waves -----	9%*
Position of fronts -----	4%
Position of highs -----	3%
Forecasts -----	3%*
Analysis -----	2%*
Precipitation areas -----	less than 1%

*These answers were vague in that they may be incorporated in other answers, e.g., location of fronts, lows, may be included in requests for analysis.

It is interesting to note the high percentage requesting pressure center location. These, together with requests for analyses, synopses, and frontal positions, suggest that some captains are making their own forecasts.

4, 6, 7. Services, Format, Suggestions, and Complaints.

Questions 4, 6, and 7 asked for particular problem areas and suggestions for improved services. It was not possible to summarize these answers nor was it desirable to do so since each comment seemed to have merit. To retain these comments intact, we have listed them with only a slight editing and placed them under rather broad categorical subheadings (Appendix I).

In general, 22% of the officers interviewed expressed "complete satisfaction" with all phases of the weather service. While 78% offered constructive suggestions or minor complaints, it seems safe to say that most were satisfied.

V. SUMMARY

It is most difficult to come to any conclusion from data such as these since so much depends on the evaluator's point of view. However, some of the highlights can be summarized.

It is apparent that most ships' masters are receiving some kind of pre-departure weather information (65%), but it should be of concern that one-third of the vessels received no briefings at all. It is not clear why these ships did not receive predeparture information. One might conjecture that there is a lack of information regarding availability of services.

Communication facilities aboard vessels seem adequate, with many ships utilizing several modes of communication for weather data acquisition. There appear to be a growing number of vessels equipped with radio facsimile equipment (nearly all Japanese vessels are so equipped). There were subtle indications that those equipped with facsimile were the most satisfied with the overall weather services.

While it was anticipated that wind and waves would rank number one among elements affecting ship operations, it was a little surprising to note that fog ranked number three and that fog was never mentioned as a problem in the open sea, but rather in coastal areas only.

Many of the officers continue to stress the importance of a weather synopsis and analysis in marine bulletins.

There appears to be considerable concern regarding technical jargon in marine warnings and forecasts. Also, disagreement among weather centers covering the same or adjacent areas is causing some confusion. There appears to be a need for better coordination between agencies providing weather services on the high seas, particularly civilian and military. In many cases foreign vessels do not draw a distinction between the National Weather Service, U. S. Navy, and the Coast Guard.

In general, ships' officers expressed satisfaction with services now being provided but have offered many suggestions which should help us to improve our services.

VI. ACKNOWLEDGMENT

We appreciate assistance given to us by the Port Supervisors at San Francisco, Los Angeles, Seattle, Honolulu, and the Canal Zone and our special appreciation goes to Messrs. Paul Arnerich and Ron White of the Pacific Marine Office, San Francisco.

FIGURE 1

MARINE SERVICES QUESTIONNAIRE

Name of Ship _____ Company _____
Country _____ Tonnage _____ Type _____
Route Traveled _____

1. Do you receive weather information prior to departure? If so, where and how?
2. How are weather warnings and forecasts received aboard your vessel; e.g., radio CW or voice, radio fax, VHF/FM, commercial radio, CG radio, Navy?
3. What weather elements most affect your ship's operations, e.g., wind, fog, precipitation, waves, etc., and in what magnitude?
4. Do you have difficulty with the length or format of the weather bulletins?
5. What elements do you look for first in the bulletin?
6. Do you have any specific complaints or commendations regarding marine weather services provided by the NWS? Be specific regarding times and dates.
7. What suggestions do you have that would improve our service to you?

Note: This form is to be completed by the PMO and copies sent to:

WRH, WFW41.5
WSFO (appropriate one)
PMO, SFO

TABLE I

NUMBER OF SHIPS FROM EACH COUNTRY
REPRESENTED IN INTERVIEWS

Netherlands -----	7
England -----	11
United States -----	32
Japan -----	13
Denmark -----	5
Sweden -----	7
Germany (W.) -----	5
Norway -----	5
Liberia -----	8
Yugoslavia -----	1
India -----	1
Greece -----	3
Italy -----	3
Belgium -----	1
China (Rep.) -----	4
Korea -----	2
France -----	4
Israel -----	1
Unknown -----	2

TABLE 2

TYPE OF VESSELS

Freighters -----	55
Bulk Carriers -----	18
Passenger Liners -----	7
Tankers -----	16
Container Ships -----	10
Reefers -----	7
Deep Sea Tug -----	1

APPENDIX I

OFFICERS' COMMENTS AND SUGGESTIONS

RADIO BROADCASTS

NSS

NSS is most excellent providing complete coverage in the Atlantic. Suggests that a strong counterpart to NSS be established for the Pacific.

Transmission rate is too slow over NSS.

Receive considerable interference on NSS.

NSS and KWAJ transmissions do not agree with WSMS.

NSS broadcasts are too slow.

Likes NSS.

NSS is best in the Atlantic.

NSS analysis is too long and uses too many points for isobars.

SCHEDULES

Conflicting schedules. Different stations broadcast at the same time for the same areas. Radio operator can copy only one at a time, thus misses some areas.

NWS reports 3 times/day at SFO. This is a good schedule.

VHF/FM should be updated more often for coastal ship operations.

Broadcast schedules need to be realigned to fit radio operator's duty hours.

Navy broadcasts have no schedule or format.

Broadcasts need to be updated more often.

Schedules fall outside the radio operators duty hours.

FORMAT

Military broadcasts too fast.

NPN is difficult to understand.

Navy broadcasts are too long.

NBA is difficult to copy.

Navy format is undependable and too long.

Each Center seems to have a different format.

JMC format is shorter yet covers more area with more information than U.S.

Too many mistakes in Navy broadcasts.

Different formats used by various stations.

Why not use an international format?

Sometimes NWS broadcast contained too much narrative. Waste time of radio operator.

NWS should use latitude and longitude rather than geographical locations which are unfamiliar to foreign vessels.

Too many references to other broadcasts are made in Navy bulletins.

APPENDIX I (Continued)

TERMINOLOGY

Misspelled words in broadcast cause difficulty for non-English speaking radio operator.

Eliminate forecaster terminology and give more facts.

Language often too technical.

Eliminate confusing terminology, e.g., short wave.

Bulletin terminology too confusing.

Abbreviations are not understood.

RADIO FAX

Radio facsimile products are not broadcast by the NWS. Complaints and suggestions listed refer primarily to the Navy and Japanese broadcasts.

Navy fax broadcasts are very good. Commercial stations do not agree with Navy.

Fax broadcasts of forecasts and analysis differ between centers.

Fax coverage throughout the Pacific is very good.

Too many radio fax charts covering the same area.

Coast Guard radio broadcast of position of lows and fronts do not agree with Navy fax charts.

Need chart showing fax abbreviations and symbols used by various centers.

Provide explanation of fax chart symbols.

Areas of facsimile charts is too small. Centers should cover larger areas.

Extended SFO analysis to 160°E. on NPG fax chart is needed.

Provide radio fax service from two stations--one in U.S. and one in Japan with overlapping coverage.

Navy fax schedule is too flexible, unable to keep up with changes.

Unable to keep abreast of fax schedule changes.

BROADCAST INFORMATION AND MISCELLANEOUS

SYNOPSIS

Position of lows, highs, and fronts should be included in the bulletin.

Include position of fronts and lows on commercial stations and on KPH.

Frontal positions should be included in the broadcasts.

Include location of fronts in broadcasts.

More information on position of lows is needed.

Would like map analysis broadcast for the Pacific.

Include frontal positions in bulletin.

Position of storms in the Atlantic is excellent.

Storm positions in the Pacific are sketchy.

Would like to receive synopsis and analysis.

APPENDIX I (Continued)

ADDED FORECAST SERVICE

Need more coverage in the Caribbean area.
Better accuracy of Caribbean forecasts is needed.
Include offshore weather conditions in VHF/FM broadcasts.
Need more detail in coastal forecasts for fog conditions.
Include forecast of bar conditions in VHF/FM broadcasts.
More synoptic data for offshore area in VHF/FM broadcasts.
Would like offshore visibility included in forecast when visibility is low.
Would like forecast available for area south of Panama.
San Francisco should provide better coverage for the dateline area.
SFO forecasts are excellent east of 160°W.
San Francisco forecasts do not go far enough south.
Temperate zone of the eastern South Pacific should have routine forecasts.
Would like Japanese and San Francisco forecast coverage to overlap at the date-line to provide better coverage.
Need Gulf of Tehuantepec extended forecast.
Would like more convenient access to weather charts and forecasts prior to departure.
Would like to receive wave forecasts for the Pacific.
Would like sea and swell information in bulletins.
Need wave forecast of period and direction.
Give ice conditions at sea.
Need better coordination among centers serving marine interests.
Bulletins from different centers do not agree.
Mid-ocean bulletins disagree between centers.
Likes Japanese coverage of the Pacific best.
Gulf of Alaska lows are not accurately located.
Coastal forecasts on the eastern seaboard not as good as past five years.
Need to improve forecast accuracy.
NWS is excellent on Caribbean and Pacific tropical storms.
When calls are made to weather ships (any flag), Master receives no answer.

Western Region Technical Memoranda: (Continued)

- No. 45/2 Precipitation Probabilities in the Western Region Associated with Spring 500-mb Map Types. Richard P. Augulis. January 1970. (PB-189434)
- No. 45/3 Precipitation Probabilities in the Western Region Associated with Summer 500-mb Map Types. Richard P. Augulis. January 1970. (PB-189414)
- No. 45/4 Precipitation Probabilities in the Western Region Associated with Fall 500-mb Map Types. Richard P. Augulis. January 1970. (PB-189435)
- No. 46 Applications of the Net Radiometer to Short-Range Fog and Stratus Forecasting at Eugene, Oregon. L. Yee and E. Bates. December 1969. (PB-190476)
- No. 47 Statistical Analysis as a Flood Routing Tool. Robert J. C. Burnash. December 1969. (PB-188744)
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- No. 51 Western Region Sea State and Surf Forecaster's Manual. Gordon C. Shields and Gerald B. Burdwell. July 1970. (PB-193102)
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- No. 59 Application of P.E. Model Forecast Parameters to Local-Area Forecasting. Leonard W. Snellman. October 1970. (COM-71-00016)

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- No. 60 An Aid for Forecasting the Minimum Temperature at Medford, Oregon. Arthur W. Fritz. October 1970. (COM-71-00120)
- No. 61 Relationship of Wind Velocity and Stability to SO₂ Concentrations at Salt Lake City, Utah. Werner J. Heck. January 1971. (COM-71-00232)
- No. 62 Forecasting the Catalina Eddy. Arthur L. Eichelberger. February 1971. (COM-71-00223)
- No. 63 700-mb Warm Air Advection as a Forecasting Tool for Montana and Northern Idaho. Norris E. Woerner. February 1971. (COM-71-00349)
- No. 64 Wind and Weather Regimes at Great Falls, Montana. Warren B. Price. March 1971.
- No. 65 Climate of Sacramento, California. Wilbur E. Figgins. June 1971. (COM-71-00764)
- No. 66 A Preliminary Report on Correlation of ARTCC Radar Echoes and Precipitation. Wilbur K. Hall. June 1971.
- No. 67 Precipitation Detection Probabilities by Los Angeles ARTC Radars. Dennis E. Ronne. July 1971.