Scientific Journals
Maritime University of Szczecin

Zeszyty Naukowe
Akademia Morska w Szczecinie

2010, 21(93) pp. 88–97

2010, 21(93) s. 88–97

The problem of ship voyage evaluation by the charterer and the owners

Problem rozliczania podróży statku przez czarterującego i armatora

Bernard Wiśniewski[1], Mirosław Wielgosz[1], Tadeusz Piotrowski[2]

[1] Maritime University of Szczecin, [2] Polish Steamship Company
[1] Akademia Morska w Szczecinie, 70-500 Szczecin, ul. Wały Chrobrego 1–2
[2] Polska Żegluga Morska, 70-419 Szczecin, Plac Rodła 8

Key words: ship voyage evaluation, ship weather routing, speed characteristics, post-voyage testing

Abstract
The authors address the problem of settlement of voyage time by the charterer and its demand of compensation from the carrier company for an alleged extension of the vessels voyage. They analyzed a voyage of ship "Diana" where the charterer hired the company AWT for weather routing the ship and then settle voyage time and fuel consumption. The analyzed documentation included the settlement of voyage by AWT and the charterer to shipowner's claim for compensation for the extension of voyage time. The authors subjected the weather data from three sources (AWT, Ship's Log Book, SPOS program) to a repeated evaluation and performed similar computations demonstrating that the calculations by weather-routing centres are not always faultless and fail to use actual and reliable data.

Słowa kluczowe: ocena podróży statku, pogodowe prowadzenie statku, charakterystyka prędkości, badania po podróży

Abstrakt
Artykuł dotyczy problemu rozliczania czasu podróży statku przez czarterującego oraz roszczeń po podróży za niedotrzymanie przez statek warunków umowy czarterowej. Przeanalizowano rzeczywistą podróż statku „Diana", gdzie czarterujący posłużył się firmą AWT do prowadzenia i doradztwa pogodowego statku, a następnie rozliczenia podróży pod względem czasu i zużycia paliwa. Do ukazania problemu wykorzystano dokumentację dostarczoną przez armatora, zawierającą także rozliczenie podróży przez ośrodek AWT oraz roszczenie czarterującego do armatora o rekompensatę za przedłużenie podróży o 11,98 godziny. W artykule poddano ponownej analizie dane pogodowe z trzech źródeł (AWT, Dziennika okrętowego i programu SPOS). Zestawiono je na wykresach jednoznacznie wskazujących różnice w danych, na których opierano rozliczenia, a mające znaczący wpływ na otrzymane wyniki.

Introduction

In a time of acute financial crisis in the freight and sea transport market at the end of the first decade of the 21st century, no wonder protests started to appear more and more frequently claiming compensations resulting from the urge to maximize currently thin profits on transport / vessel charter or in some cases to minimize loss by one of the parties of the charter agreement. There has appeared a phenomenon of scrupulous carrying into effect all provisions of the charter agreement. The tools in the hands of the charterers are the vessel weather-routing centres which provide route recommendations based on the criteria of minimum voyage time and minimum fuel consumption, comfort of the voyage, ship safety conditions, and cargo care [1, 2, 3].

These centres perform ship voyage evaluation and send a final report to the recipient of the service, in most cases to the charterer. Such reports are often indiscriminately accepted by the client

and form the basis for making a claim of the charterer against the carrier for breaching the terms of the agreement. The basic quantities analyzed as well as questioned include the charter speed not being maintained, prolonged time of voyage and excessive fuel consumption.

The charterer's operations, even if carried out in good faith and according to the principles of fair play, can turn out to be quite harmful to the carrier due to the possibly improper evaluation of the voyage by the shore centre (too scarce and improper weather data, standard vessel's speed characteristics taken from the manual not corresponding to the actual dynamics of the ship movement in the waves and the wind) [1]. Unfortunately, this kind of data is used for the final evaluation of the voyage and after their presentation to the client they serve as a basis for lodging a claim against the carrier.

It is worth noting that even a slight infringement of terms and conditions provided in the agreement can be a reason of protest, rarely the case in the days of prosperity in the market of sea transport at the beginning of the 21st century.

The case study presented below is concerned with a charterer demanding a compensation from a carrier for an alleged extension of the vessel's voyage by mere twelve hours in view of the amount of 21 days of the total voyage time and where a ship passes through several climatic zones of the North Atlantic and Mediterranean waters in autumn. The claim was based on the report of AWT (Applied Weather Technology) routing centre and the factors the centre uses in calculations.

The authors subjected the weather data to a repeated evaluation and performed analogical computations demonstrating that the calculations by weather-routing centres are not always faultless and fail to use actual and reliable data.

Conditions and assumptions of a vessel's voyage evaluation

The m/v "Diana" was chartered by the Polish Steamship Company (PŻM) to Nidera PLC (Italy). She made a voyage (No. 122) from Paranagua (Brazil) to Koper (Slovenia) from 10th to 31st of Oct. 2009. The following contractual agreements were concluded in the Charter Party signed between PŻM and the charterer:

- speed through calm water in laden condition (V_0) 13.6 knots;
- above said speed maintained at maximum wind force $\leq 4^o$ B and sea state ≤ 3 (Douglas scale) with no impact of swell and no adverse current;
- fuel consumption at sea: IFO 31.5 MT/day;
- when the weather conditions are worse than the above mentioned, performance results cannot be protested against.

In order to review the ship's performance the charterer ordered "weather-routing information" and the evaluation performed by the shore-based Applied Weather Technology (AWT) centre.

The ship had its own ship performance optimization system – SPOS – used to gather information about the prevailing weather conditions (weather analysis and forecasts for the next ten days). During the voyage, the vessel reported daily the following data to the AWT centre at midday local time: its position, weather conditions observed – wind force and direction and the height and direction of swell.

After delivering its data and passage plan (the shortest possible track, pilot – pilot following the loxodromic line sections) the ship received from the AWT centre general instructions on the co-operation and communication with the centre. Then the vessel received at the intervals of 3 to 4 days weather forecasts for the next five days as well as routing recommendations. In the voyage under consideration, there was no need for the deviation from the shortest possible route due to hydrometeorological conditions. Therefore, the recommendations were usual ones, i.e. to follow the shortest safe track, proposed earlier by the captain and approved of by the centre. During the voyage the shore centre did not raise any issues about the route or the attained service speed.

After completing the voyage the charterer submitted a written note to *PŻM* requesting compensation to the tune of 18 000 USD for an alleged breach of the charter agreement conditions due to the difference between the vessel's actual speed of 12.6 knots attained throughout the whole voyage and the speed of 12.91 knots calculated theoretically by means of the factors assumed by AWT.

Preparation and verification of evidence

The charterer submitted the evaluation of the m/v "Diana's" sea voyage that was compiled by the AWT (tables 1 and 2) in which the tabulated calculations also include the data sent from the ship to the AWT shore centre (positions, weather) as well as the weather data obtained by the AWT from its own data bank.

Weather records of the SPOS system and the entries in the ship log book relating to the ship's voyage period (10–31 Oct. 2009), apart from the navigational documentation, made up the basis of this analysis.

The testing of the ship's voyage was carried out using the ship Diana's speed characteristics in waves and wind and the computing software SPOS to calculate the distance, time and actual speed attained on respective days of the voyage.

The following observations were made relating to the materials and the AWT report (table 1):

- the disputable items are "weather factor" (–0.19 knots), "current factor" (0.0 knots and 0.06 knots, respectively, in all conditions and in good weather conditions only as provided in the Charter Party) and the methodology of calculating "predicted average speed" in the annotations to table 1 without justification of why deducting 0.5 knot from the CP speed was made;
- it is illogical that the "performance speed" of 12.79 knots for both the whole voyage and the separated part of the voyage (so called "good weather") were the same;
- due to the analysis of the weather records it cannot be accepted that 50% of the voyage was to take place in "good weather" conditions whereas, as it was calculated from the SPOS data, such conditions prevailed in only 25% of the period.

Table 1. AWT's evaluation of the voyage time (AWT Performance Evaluation) [4]
Tabele 1. Ocena czasu podróży dokonana przez firmę AWT (ocena wydajności)

Performance Evaluation

DIANA	Reference 090925035
NIDERA S.P.A. (ITALY)	Laden voyage
From: PARANAGUA (25.62S 48.27W)	ATD: Oct 10 2009 1120Z
To: KOPER (45.57N 13.7E)	ATA: Oct 31 2009 1345Z

Voyage summary	Overall	Good weather
Distance sailed	6256.2 NM	3223.8 NM
Time en route	496.58 hours	250.92 hours
Average speed	12.60 knots	12.85 knots
Current factor	0.00 knots	0.06 knots
Weather factor	–0.19 knots	
Performance speed	12.79 knots	12.79 knots

Time analysis	Overall
Performance speed	12.79 knots
CP speed	about 13.6 knots
*Predicted avg. speed	12.91 knots
**Predicted time	484.60 hours
Time (loss) / gain	(11.98) hours

* Predicted avg. speed = (CP speed – 0.5) + (average speed – performance speed)

** Predicted time = actual distance sailed / predicted speed

Here are some comments on table 2:

a) The report partially provides the weather conditions reported by the ship, i.e. wind direction and force in Beaufort scale in the telegrams but it does not account for these conditions in further calculations, those providing the information placed in table 1. Neither does it state the height and direction of the wave or swell as reported by the ship.
b) In this connection the comparison was made of the AWT data to the entries in the ship log book reported by the ship and an independent, well proved in practice, source of weather information – SPOS – covering the period of the ship's sailing (10th to 31st Oct. 2009).

It should be stressed that the SPOS operates using a unique and wide-ranged weather forecasting system devised by Meteo Group. It draws on information from three currently most renowned world weather models:

- ECMWF model (European Centre for Medium--Range Weather Forecasts) – a joint European weather service;
- UKMO / "Bracknell" model from the UK Meteorological Office;
- NCEP model from the American National Weather Service (part of NOAA).

Meteo Consult calculates a new weather forecast by weighting the forecasts from the above mentioned three models and partial ECMWF forecasts characterized by their very high reliability. A model like that is defined as a NMB (Nautical Meteo Base).

Using this algorithm minimizes the error of the forecast given by one of the above mentioned models (for details see: www.spos.nl/weather-quality.html).

In figures 1 and 2 the discrepancies between the discussed data sources have been presented.

The SPOS forecasts and analyses can be considered to be more objective.

They show that the conditions given in Captain's report and those in the SPOS agree. The AWT-reported swell height is too low. It can also be stated that AWT is not fully consistent giving for the same wind force of 4°B the swell height of 0.6 m in one case and in the other 1.1 m (see table 2 for the AWT report). The differences between AWT and SPOS amount to 1m in the height and even 3°B in the wind force.

We consider SPOS to be a very reliable source owing to the data bank used. As far as the weather is concerned AWT forecasts are too optimistic in most cases, which has a substantial influence on

Table 2. AWT Weather data tabulation (AWT Voyage Summary) [4]
Tabela 2. Tabelaryczne dane pogodowe firmy AWT (podsumowanie podróży AWT) [4]

DIANA
NIDERA S.P.A. (ITALY)
From: PARANAGUA (25,62S 48,27W)
To: KOPER (45,57N 13,7E)

Reference 090925035
Laden voyage
ATD Oct 10 2009 1120Z
ATA Oct 31 2009 1345Z

Parameters					AWT analyzed conditions							Reported weather		Interval	
	Date	Time UTC	Position		Wind		Wave	Swell		Current					
			LAT	LON	DIR	BF	M	DIR	M	REL.DIR	KTS	DIR	BF	NM	KTS
BR	10-Oct	1120	Dep. PARANAGUA												
RP	10-Oct	1500	25.4S	47.4W	E	4	0.6	SSE	0.8	HD	0.2	E	4	49.9	13.60
RP	11-Oct	1500	24.0S	42.3W	E	5	1.7	SSW	1.5	BW	0.7	E	5	289.5	12.06
RP	12-Oct	1400	21.1S	38.7W	NE	4	0.5	SSW	1.6	BW	0.3	ENE	5	275.9	12.00
RP	13-Oct	1400	16.6S	36.3W	NE	4	1.1	NE	1.1	HD	0.7	NE	5	300.9	12.54
RP	14-Oct	1400	12.0S	34.2W	ENE	4	0.9	E	1.4	HD	0.1	ENE	5	300.3	12.64
RP	15-Oct	1300	7.8S	32.2W	E	4	1.2	ESE	2.1	BW	0.3	E	5	282.1	12.27
RP	16-Oct	1300	3.4S	30.1W	ESE	4	1.2	SE	2.1	HD	0.3	ESE	6	289.5	12.06
RP	17-Oct	1300	1.3N	28.0W	ESE	4	1.0	SE	1.8	BM	0.2	SE	5	306.9	12.79
RP	18-Oct	1300	6.1N	25.8W	SSE	4	0.6	SSE	1.9	QF	0.7	SSE	4	317.9	13.25
RP	19-Oct	1200	10.5N	23.7W	WSW	1	0.1	SSE	1.5	FL	0.1	WNW	4	294.7	12.81
RP	20-Oct	1200	15.2N	21.4W	NE	4	0.9	SSE	0.8	BM	0.5	NE	5	310.2	12.92
RP	21-Oct	1200	19.8N	19.2W	NNE	5	1.4	NW	0.8	QF	0.2	NE	6	303.9	12.66
RP	22-Oct	1200	24.4N	17.0W	ENE	4	0.7	NNW	1.6	BM	0.2	NE	5	302.0	12.58
RP	23-Oct	1200	28.8N	14.5W	NNE	4	0.9	NNW	2.3	BW	0.2	NE	5	294.3	12.26
RP	24-Oct	1200	32.1N	10.8W	NE	5	1.4	NE	1.8	BM	0.1	NE	6	278.8	11.62
RP	25-Oct	1100	35.4N	6.6W	NNE	4	0.9	WNW	0.7	FL	0.1	NE	4	286.4	12.45
AP	25-Oct	1630	Arr. GIBRALTAR		N	2	0.2	W	0.7	FL	0.6			73.7	13.40
DP	26-Oct	220	Dep. GIBRALTAR												
RP	26-Oct	1100	36.3N	2.8W	E	5	1.4	NNE	0.3	QF	0.2	E	4	125.0	14.42
RP	27-Oct	1100	37.1	3.6	NE	3	0.4	NNE	0.3	FL	0.6	E	4	310.3	12.93
RP	28-Oct	1100	37.5N	9.9E	NNW	3	0.5	NNW	0.2	FL	0.6	NNW	4	303.2	12.63
RP	29-Oct	1100	37.3N	15.9E	N	2	0.2	NE	0.5	QF	0.1	NW	4	314.6	13.11
RP	30-Oct	1100	41.2N	17.7E	NNE	5	0.9	E	0.5	BM	0.8	NNE	6	298.1	12.42
RP	31-Oct	1100	45.1N	13.3E	ENE	3	0.2	E	0.3	BW	0	ENE	4	308.9	12.87
ER	31-Oct	1345	Arr. Koper		N	3	0.3	E	0.2	HD	0.1			36.2	13.16

Positions: BR – Begin Route, ER – End Route, AP – Arrive Middle Point, DP – Depart Middle Point
SV – Stop Voyage, RV – Resumed Voyage, CP – Calculated Position
Directions: HD – Head, BW – Bow, BM – Beam, QF – Qfollow, FL – Follow
Days highlighted are analyzed as good weather days
Good weather days are considered those days during which over one half of the weather encountered meets the good weather criteria

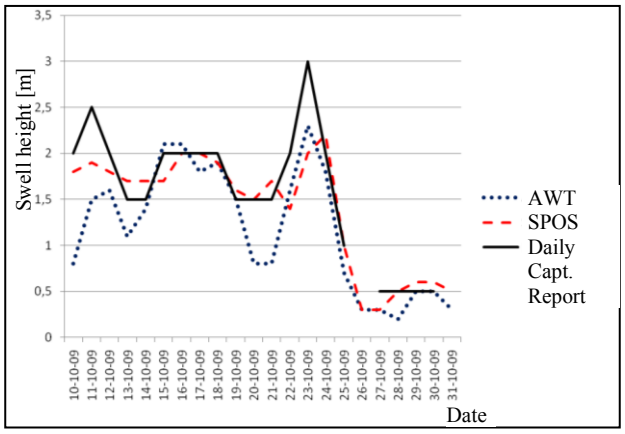

Fig. 1. Swell height [m] for respective days of the voyage according to different sources
Rys. 1. Wysokość falowania (w m) dla poszczególnych dni podróży na podstawie danych z różnych źródeł

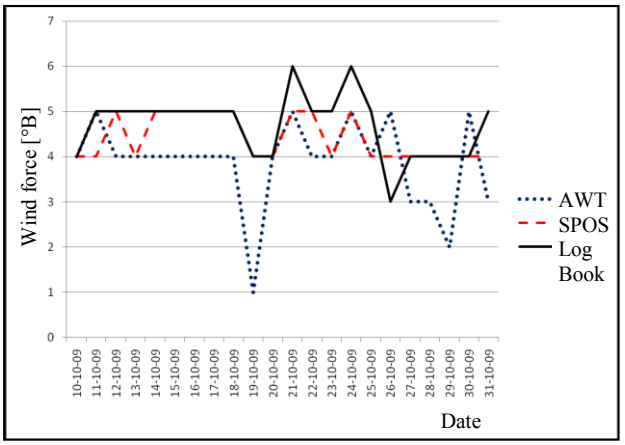

Fig. 2. Wind force in °B for respective days of the voyage
Rys. 2. Siła wiatru w stopniach Beauforta dla poszczególnych dni podróży

a slightly negative value of the weather factor (weather factor = –0.19 knot), at the same time, it will not be consistent with the loss of speed in wind and swell calculated by the authors according to the speed characteristics of the ship.

c) The role of the currents in the calculation of track and speed included in table 2 is not reflected in the results in table 1. It should be added that these data, given every 24 hours, are too general for the effect of the current to be calculated.

Testing the ship's route after the voyage based on ship's speed characteristics and SPOS system – the results of calculations

The following were used in the testing:

- SPOS weather data bank for the period of the voyage from 10th to 31st Oct. 2009;
- the speed characteristics of the ship "Diana" according to SPOS software requirements;
- SPOS computing software based on the application of the isochrone method [5].

Besides, the testing included these steps:

- performing calculations to obtain the ship's true position every 24 hours, at the specified time of reporting the actual weather information to AWT (usually at ship's midday);
- performing, each time, calculations of the distance to the point of destination (port of Koper) at the sampling frequency of all the data every three hours in accordance with the methodology requirements [1, 4, 6];
- the stop in the voyage of 09 hrs 50 min for bunkering at the Gibraltar roadsteads was taken into account.

In this way the conditions were determined in which the calculations refer to the actual weather conditions and each time the SPOS system calculates the whole distance and indicates ETA taking account of the charter party speed V_0 = 13.6 knots.

Part of the testing data is shown in table 3 for the first phase of the calculations, from the start of the voyage (after pilot's disembarkation).

At the beginning of the voyage the ship witnessed the sea height of 2 m, wind velocity of

Table 3. The part of the SPOS testing data – Phase 1
Tabela 3. Część danych z programu SPOS – etap 1

Track results

WP nr	Date/Time dd/mm hh:mm	Lat. deg:min	Lon. deg:min	Leg nr	Crs deg	Time hrs	Dist miles	Speed ground knots	Speed water knots	Speed water %
1	10/10 11:20	25°37'S	048°16'W							
2	10/10 14:20	25°27'S	047°37'W	1	075	3.0	37.0	12.3	12.2	90%
3	10/10 15:18	25°24'S	047°24'W	1	075	1.0	11.8	12.1	12.1	89%
4	10/10 18:18	25°09'S	046°48'W	2	065	3.0	36.1	12.0	12.0	88%
5	10/10 21:18	24°56'S	046°11'W	2	069	3.0	35.7	11.9	12.0	88%
6	11/10 00:18	24°42'S	045°35'W	2	067	3.0	35.8	11.9	12.1	89%
7	11/10 03:18	24°33'S	044°57'W	2	074	3.0	35.5	11.8	12.0	88%
8	11/10 06:18	24°25'S	044°20'W	2	078	3.0	35.0	11.7	11.8	87%
9	11/10 09:18	24°18'S	043°43'W	2	078	3.0	34.7	11.6	11.8	87%
10	11/10 12:18	24°12'S	043°04'W	2	080	3.0	35.8	11.9	12.0	88%
11	11/10 15:18	24°02'S	042°27'W	2	074	3.0	35.6	11.9	12.0	88%
12	11/10 16:00	24°00'S	042°18'W	2	074	0.7	8.1	11.7	11.8	87%
13	11/10 19:00	23°37'S	041°49'W	3	050	3.0	35.4	11.8	11.8	87%
14	11/10 22:00	23°14'S	041°19'W	3	050	3.0	35.7	11.9	12.0	88%
15	12/10 01:00	22°50'S	040°49'W	3	049	3.0	36.4	12.1	12.1	89%
.....										
177	30/10 22:46	43°19'N	015°25'E	25	321	3.0	40.4	13.5	13.5	99%
178	31/10 01:46	43°51'N	014°49'E	25	320	3.0	40.4	13.5	13.5	99%
179	31/10 04:46	44°19'N	014°08'E	25	314	3.0	40.8	13.6	13.6	100%
180	31/10 07:46	44°51'N	013°34'E	25	323	3.0	40.4	13.5	13.5	99%
181	31/10 09:11	45°06'N	013°18'E	25	323	1.4	18.9	13.4	13.5	99%
182	31/10 11:15	45°32'N	013°29'E	26	016	2.1	27.2	13.1	13.2	97%
Totals & Averages						503.9	6247.3	12.4	12.4	91%

20 kn, and the current generally opposite to the heading (0.5 kn, Brazilian current).

From the first day of the voyage the testing showed the following results (average for the whole voyage):

- speed over ground: 12.55 kn,
- speed over water: 12.51 w. (92% V_0),
- distance: 6,256.1 Nm,
- fuel consumption: 655.6 MT,
- duration of the voyage: 20 days 19 hrs,
- ETD (UTC): 10th Oct. 1120 hrs,
- ETA (UTC): 31st Oct. 0649 hrs,
- the impact of the wave height on the ship's speed over water (%V_0) was recorded as a percentage of ship's speed attained (and that it would be attaining in the next days of the voyage) in relation to the charter speed V_0 = 13.6 knots over calm water (Fig. 3).

As it follows from the attached printout of the testing on 10 Oct. 2009 (Table 3) and the above diagram (Fig. 3) there is a direct dependence of the ship's speed (percentage of the speed over water in relation to V_0) on the sea height (wave + swell). From 10 to 25 October 2009 the wave height exceeded 1.25 m, which corresponds to the sea state bigger than 3° SM (i.e. these conditions are worse than the so called good sea conditions according to the AWT criterion).

Therefore, this period constitutes about 75% of the whole voyage time, not the 49% stated by AWT.

The testing in the following days confirmed that from 10 to 25 Oct. 2009 there prevailed worse conditions rather than the good ones as claimed by AWT. Attached are examples of weather charts chosen from SPOS (Figs. 4 and 5).

In further tests covering the following days of the voyage similar evaluation data of the ship's route were obtained. The selected synthetic results of the tests are shown in table 4.

The ETA calculations show high consistency at each stage which proves that the SPOS predicted weather conditions conformed to the actual conditions observed.

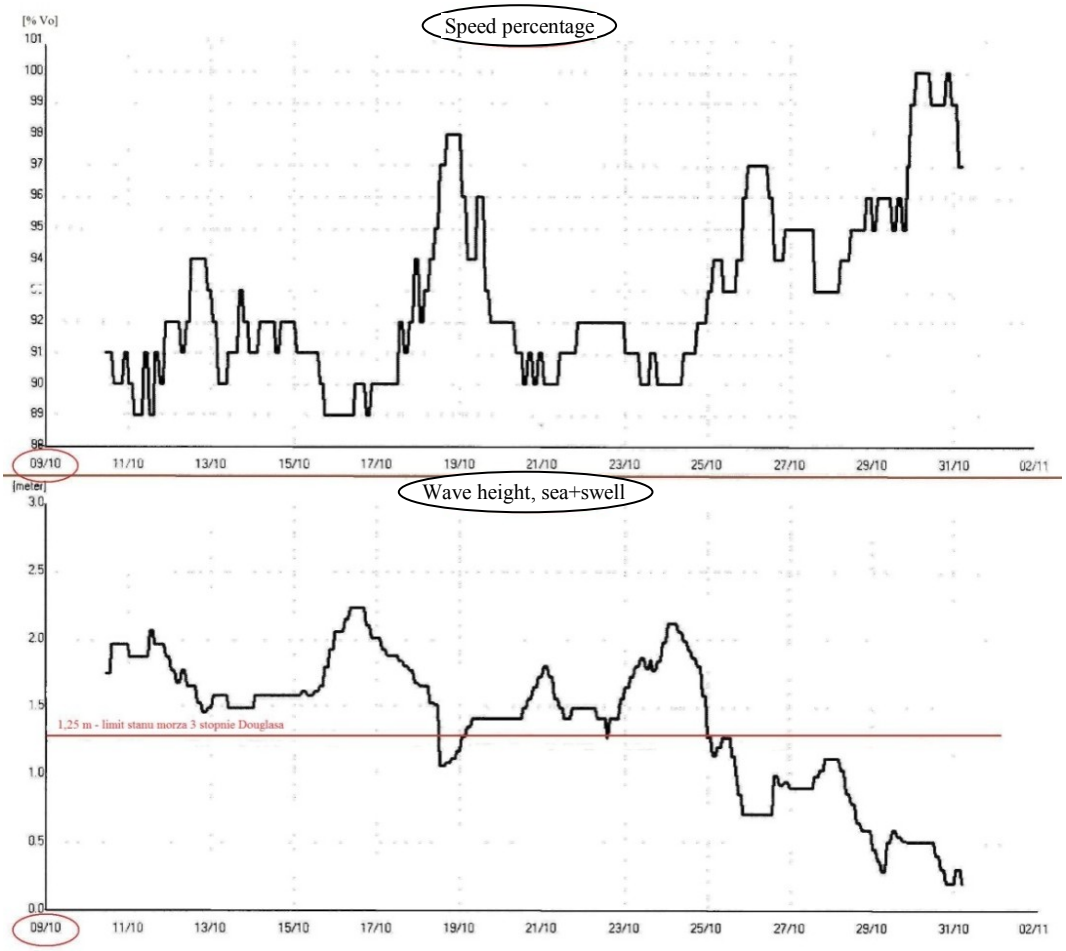

Fig. 3. The impact of the wave height on the ship's speed over water (% V_0)
Rys. 3. Wpływ wielkości fali na prędkość statku nad wodą (% V_0)

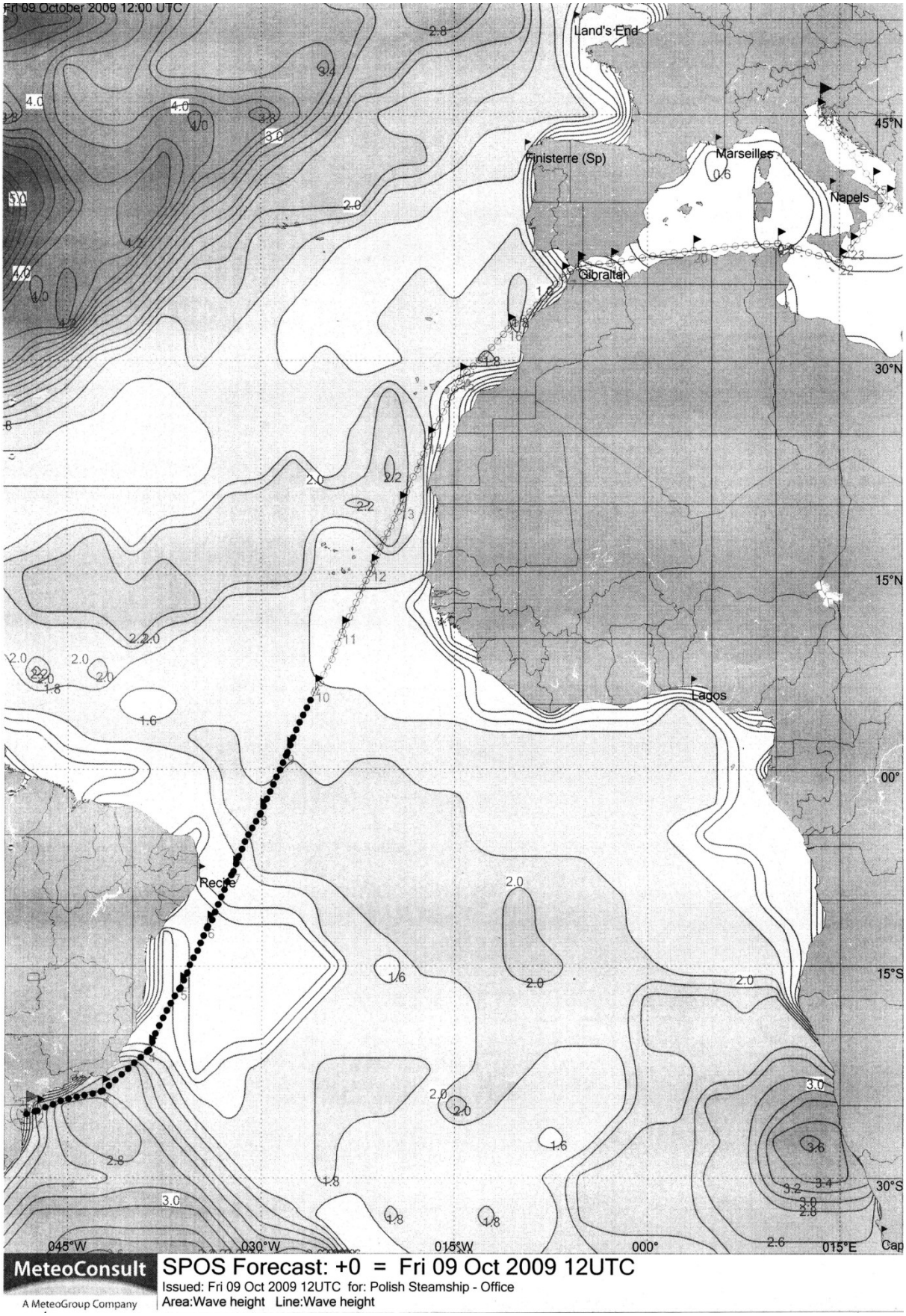

Fig. 4. Sea height forecasting printout from the SPOS software of Oct. 9, 2009 [5]
Rys. 4. Prognozowana wysokość morza jako wydruk z programu SPOS z 9 października 2009 r. [5]

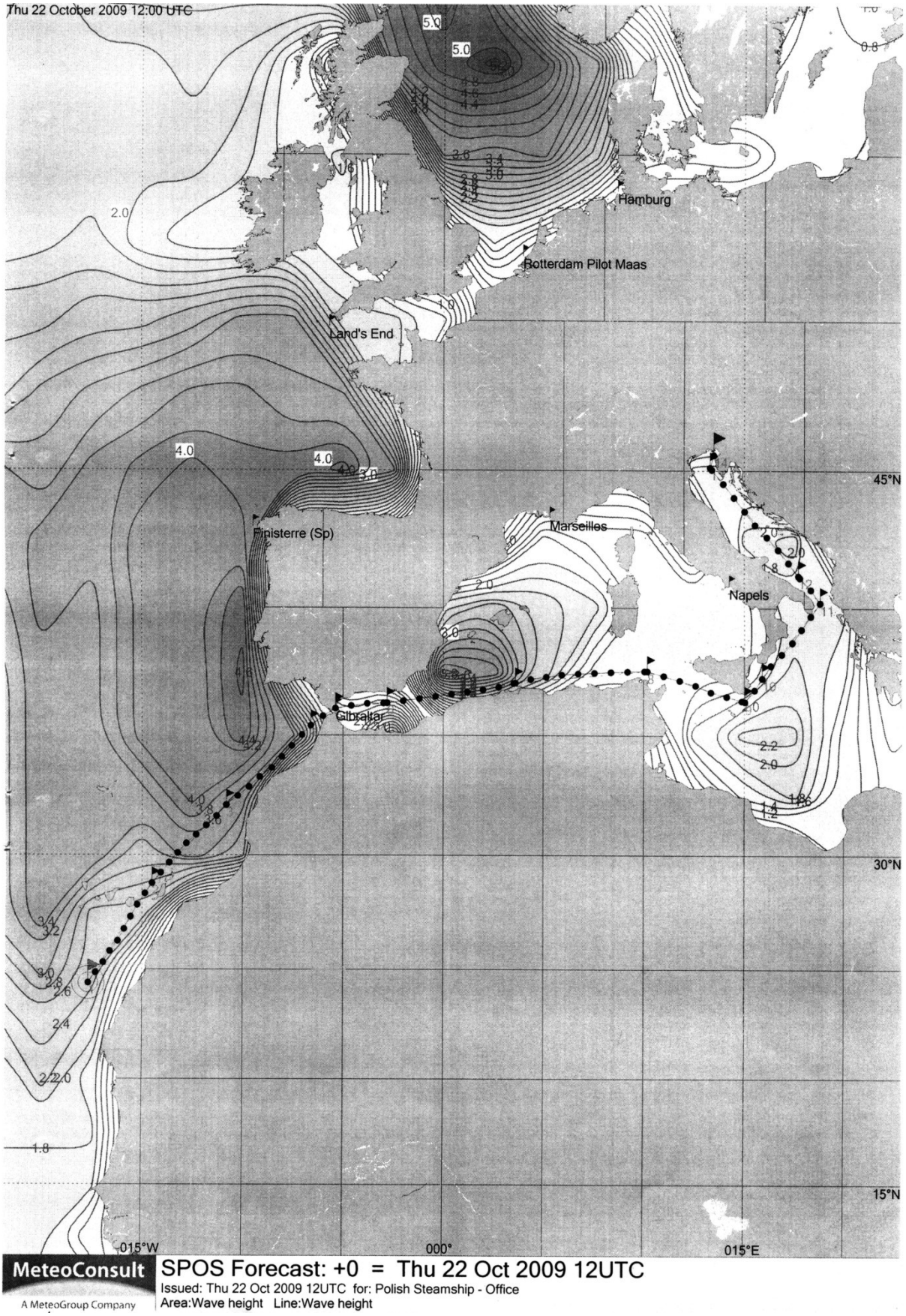

Fig. 5. Sea height forecasting printout from the SPOS software of Oct. 22, 2009 [5]
Rys. 5. Prognozowana wysokość morza jako wydruk z programu SPOS z 22 października 2009 r. [5]

Table 4. Ship's route testing results in respective legs of the voyage
Tabela 4. Wyniki badań trasy statku w poszczególnych etapach podróży

Parameters		I test 10.10.2009 1120 UTC	II test 13.10.2009 1400 UTC	III test 16.10.2009 1300 UTC	IV test 19.10.2009 1300 UTC	V test 22.10.2009 1200 UTC	25.10.2009	VI test 26.10.2009 1100 UTC
1	Latitude Longitude	25°37' S 048°16' W	16°36' S 036°18' W	03°24' S 030°06' W	10°30' S 023°42' W	24°24' S 017°00' W	Bunkering, Gibraltar Rds. – voyage suspended 09h50m	36°18' S 002°48' W
2	Distance to go [NM]	6256.1	5350	4480.5	3566.3	2651.3		1591.6
3	SOG [kts]	12.5	12.6	12.7	12.7	12.6		13
4	SOW [% V_0]	92%	93%	92%	93%	93%		95%
5	Performance Speed [kts]	12.7	12.8	12.8	12.8	12.7		12.9
6	Wind avg/max [kts]	12 / 21	13 / 21	13 / 21	13 / 20	14 / 18		14 / 17
7	Waves avg/max [m]	1.4 / 2.0	1.4 / 2.3	1.5 / 2.5	1.2 / 2.6	1.0 / 2.6		0.6 / 0.9
8	ETA [UTC]	31.10.2009 0649	31.10.2009 0501	31.10.2009 0653	31.10.2009 0542	31.10.2009 0601		31.10.2009 1334

SOG – speed over ground
SOW – speed over water – % V_0 (V_0 = 13.6 knots, calm water, without waves and wind)
Wind avg/max – wind speed, average / maximum [knots]
Waves avg/max – sea, average / maximum [m]

Considering the impact of waves and wind on the movement of a ship as a controlled object these authors are convinced that even in the so called good weather, below 4°B but with the swell occurring, the ship, due to pitching and heaving will negatively respond to variable movement resistance due to the changes of the ship's hull wetted surface. Ultimately, the impact of wind and seas (wave and swell) gave the average result for the whole voyage of 0.9 knots reduction of the ship's speed.

Taking the current factor into account results from the general circulation of permanent currents in the oceans and in calculations their seasonal specific month data are used. In this case the ship, at the beginning of the voyage sailed in the Brazilian current (the current opposite to the ship's course of ca. 0.5 kn), next in equatorial and equator currents (direction from the beam ranging from 0.5 to 1.0 kn) and in the Canary Islands current (variable current directions, mostly opposite to the ship heading ca. 0.5 kn). It can be evidenced in Routeing Charts while taking into account the probability of their occurrence – the final result – 0.1 knot as a component of the current opposite to the ship's movement translates into the prolongation of the voyage period by $01^{H}51^{M}$ (calculations acc. to Navi Sailor ECDIS 3000i of Transas company and Routeing Charts).

Summary of the results

The navigational and weather analysis of the m/v "Diana" voyage (no. 122) from Paranagua (Brazil) to Koper (Slovenia) from 10 to 31 Oct. 2009 has not corroborated the AWT calculations relating to the charter terms, particularly the speed attained by the vessel (weather factor, current factor). The negative impact of the weather conditions (weather factor) stated by the AWT (–0.19 kn) as well as the impact of the ocean currents affecting the vessel (0.00kn) do not reflect the actual conditions.

Our calculations have proved that the share of the "weather factor" amounted to "minus" 0.90 kn, whereas the negative impact of the ocean currents equaled "minus" 0.1 kn. The formula for the final entry in the report would then have the following form:

CP Speed (13.6 kn) + weather factor (–0.90 kn) +
+ current factor (–0.1kn) =
= Predicted Average Speed (12.60 kn)

Concluding, this analysis and the results constitute the basis for the rejection of the charterer's claims which rely on the AWT evaluation.

Other final remarks include the following:

a) The calculations for the analysis were made with the SPOS system using its reliable weather data bank for the time of the voyage and the m/v "Diana's" declared speed characteristics taking account of the actual weather conditions. The reliability of the calculations is supported by the fact that in the first testing at the beginning of the voyage the system accurately calculated the ETA confirmed by the vessel's actual arrival at the pilot station off the port of destination.

b) The problem the shipmaster faces lies in the algorithm for calculating ETA sanctioned by the shipping industry practice. The master is obliged to send it over to the parties concerned at the moment the voyage commences. Generally s/he is forced to base it on CP Speed and the shortest track. When the captain accounts for speed slowdown (or makes an attempt to carry out calculations for an alternative route) and calculates a different ETA, the charterer will immediately request an explanation (also from the owner's office). The writers are of the opinion that a change of the above custom is justified by implementing reliable computations from the software using precise ship speed characteristics and highly verifiable weather models, which can considerably bring the calculated ETA close to the actual ETA.

References

1. WIŚNIEWSKI B.: Problem wyboru drogi morskiej statku /The problem of chosing the ocean – going vessel's best route/. Wyd. Morskie, Gdańsk 1991.
2. Routeing Chart – North Atlantic Ocean – BA 5124(10). Routeing Chart – South Atlantic Ocean – BA 5125(10).
3. WIŚNIEWSKI B., GRZELAK Z.: Mapy faksymilowe w nawigacji morskiej /Radiofax Charts in sea navigation/. Wyd. Morskie, Gdańsk 1984.
4. Materiały Polskiej Żeglugi Morskiej dokumentacji podróży statku „Diana" (wydruki danych), raport AWT /Polish Steamship Company files of the vessel "Diana's" voyage (data printouts, AWT evaluation)/.
5. Calculation Software SPOS – v. 6.3.0.0.
6. WIŚNIEWSKI B., WIELGOSZ M.: Opinia w sprawie podróży nr 122 statku „Diana" na trasie Paranagua (Brazylia) – Koper (Słowenia) /Evaluation of vessel Diana's voyage No. 122 on the route Paranagua (Brasil) – Koper (Slovenia)/. Wyd. INM, Akademia Morska w Szczecinie, 23.12.2009 r. (multiple typewritten copies).

The study was financed from funds for science allocated for the years 2010–2012 as a research project No. 4954/B/T02/2010/38.

Recenzent:
prof. dr hab. inż. Tadeusz Szelangiewicz
Akademia Morska w Szczecinie