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S.S. EL FARO

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Supplemental Report on Review of Cargo Securing Manual and Cargo Stowage and Securing

18 November 2016

Requested by: National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington
DC 20594

This is to certify that the undermentioned personnel of National Cargo Bureau, Inc. did, at the request of the above, review comments contained in "Tote, Inc's Response to the National Cargo Bureau, Inc.'s "Report on Review of Cargo Securing Manual and Cargo Stowage and Securing" dated August 4, 2016" and have the following to report:

Geoffrey J. Davies	Chief Surveyor
Philip I. Anderson	Chief, Technical Department
Edward F. Walker Jr.	Asst. Deputy Chief, Technical

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1.0 INTRODUCTION

In Tote, Inc's Response to the National Cargo Bureau, Inc.'s "Report on Review of Cargo Securing Manual and Cargo Stowage and Securing" dated August 4, 2016, it is claimed that, "The NCB Report makes a series of erroneous assumptions, which result in faulty and unsupported conclusions in its Report". It then states that, "The most significant erroneous assumptions are:

- the NCB fails to apply (or even mention) the simplified lashing procedures in use on board the EL FARO (as reflected in the EL Class Minimum Lashing Requirements document), and, as a result, erroneously assumes that certain interior stacks of LO-LO containers were not lashed;
- the NCB erroneously assumes, without factual basis, that 60% of the RO-RO trailer cargo on the second deck was stowed with a Roloc box off the button;
- the NCB incorrectly assumes a vessel speed of 24 knots (when the correct service speed is approximately 19.5 knots);
- the NCB assumes an incorrect lashing angle of 60 degrees for the RO-RO cargo (when the Cargo Securing Manual specifies a lashing angle of 45 degrees.); and
- in performing its calculations under Annex 13 of Cargo Securing Code ("CSS Code"), the NCB oversimplifies its calculations and erroneously: (a) assumes 1/2 of the RO-RO trailer weight rests on the Roloc box (which conflicts with the Cargo Securing Manual), and (b) fails to calculate actual restraining forces due to lashings and higher coefficient of friction associated with the RORO trailer wheels."

This Supplementary Report is intended to address the comments above.

2.0 SIMPLIFIED LASHING PROCEDURES

Our review was based upon the copy of EL FARO Cargo Securing Manual provided to us, along with a Final Stow Plan provided, on which container lashings were marked (see Appendix 1).

The 'EL Class Minimum Lashing Requirements' document does not appear in the copy of EL FARO Cargo Securing Manual provided to us and is not referenced in the Cargo Securing Manual as an acceptable alternative. It was, therefore, not considered. This document was provided to us in a separate file accompanying a Cargo Securing Manual applicable to EL MORRO and EL YUNQUE, but is not referenced in the contents of that manual or referred to within.

Notwithstanding the above, if the simplified lashing procedures as reflected in the EL Class Minimum Lashing Requirements document had been followed, then we would agree with Tote's comments that CargoMax indicates that 7 of the 8 exceedances referenced in out report would not be present. We note that CargoMax still indicates lashing margin exceedance on Bay 17, Stack 08 and the simplified lashings procedures do not address lashing requirements for containers stowed in the particular configuration present in this location.

3.0 RO-RO TRAILER CARGO OFF BUTTON

We were advised that as much as 60% of the second deck cargo (RO-RO) was stowed with a roloc box off the button and considered that significant. In the Tote response, it was claimed that this percentage "is susceptible to many interpretations, in part because on the day of the EL FARO's last voyage, roughly 30% of the cargo on the second deck was non-trailer cargo, which is not designed to be secured on a button in any event". We agree that the non-trailer cargo is not designed to be secured on a button. If we remove the 30% of non-trailer cargo from the total, we are left with the remaining 30% off button applied to 70% of the cargo or 43% of the RO-RO trailer cargo on the second deck stowed with a roloc box off button. This is still a significant quantity.

4.0 VESSEL SERVICE SPEED

In the vessel's Trim and Stability booklet, service speed is listed as 24.5 kts. We used an assumed service speed of 24 kts. as a close approximation when determining maximum weights that would be likely to be properly secured off button. Notwithstanding that, as we cannot establish service speed with any certainty and noting that Tote has claimed a service speed of approximately 19.5 kts., we have prepared tables of maximum weight values for the range of speeds from 19 kts. to 24.5 kts. (see Appendix 2).

5.0 LASHING ANGLE

Tote claims that, "the NCB assumes an incorrect lashing angle of 60 degrees for the RO-RO cargo (when the Cargo Securing Manual specifies a lashing angle of 45 degrees.)". That is not correct. The Cargo Securing Manual specifies a lashing angle of 45^{o} (or a 4 feet lead) for standardized securing, i.e. trailers with roloc boxes stowed on button. When they are stowed off button, then a calculation in accordance with Annex 13 of the Code of Safe Practice for Cargo Stowage and Securing (CSS Code) should be carried out. When an Annex 13 calculation is carried out, the 45^{o} lashing specification does not apply; actual lashing angles should be used. We used an angle of 60^{o} for lashings on cargo stowed off-button based upon drawings contained in the Cargo Securing Manual and our review of photographs said to depict similar stowage on EL YUNQUE. Notwithstanding this, we have prepared additional calculations covering the angles 45^{o}, 60^{o} and the angles depicted in the drawings accompanying 'SSL EL Class Heavy Weather Lashing Requirements – RoRo' attached to the Tote response as Exhibit B, namely 58^{o}, 52^{o} and 46^{o} respectively (see Appendix 2).

6.0 SIMPLIFICATION OF CALCULATIONS

Calculations shown in our report were simplified and performed using methodology and assumptions that we believe valid given that no specific weight distributions could be determined.

6.1 Trailer weight distribution

Precise weight distribution could not be determined. A 38/62 front/rear weight distribution is derived from sample figures shown in the Cargo Securing Manual, as referenced in the Tote response. This, however, is in itself flawed as it makes no allowance for increasing weight of cargo. As cargo weight increases, the center of gravity of the container/trailer combination would necessarily move forward, towards the center of gravity of the container itself, as the weight of the trailer has less of an overall impact. It also assumes that each container is homogenously loaded with no void at the door end (rear) which, in our experience, is generally not the case. Notwithstanding this, we have prepared additional calculations using the 38/62 weight distribution (see Appendix 2).

6.2 Friction coefficients

In the calculations shown in Appendix 2, we have utilized the friction coefficient values specified in Annex 13 of the CSS Code, i.e. 0.3 for steel-rubber (deck-tires) and 0.1 for steel-steel (deck-roloc box), dry. As we could not determine whether the deck surface was wet or dry, we have also included calculations using coefficient of 0.0 for steel-steel (deck-roloc box), wet.

7.0 REMARKS

This supplementary report is issued without prejudice and is for the benefit of whom it may concern.

NATIONAL CARGO BUREAU, INC.

P. I. Anderson
Chief, Technical Department

Appendix 1 **Final Stow Plan with reported container lashings marked**

EL FARO 185S

JAX

Load Bay 001 OD

2 X 40'(2 X RFR)
6 X 45'

6 x 45 HC
8 x 40 RF
14

0010684 SEGU9070815 55466 P1 40RF E +2.2 EF	0010484 SEGU9217589 39646 P1 40RF E +0.0 EF	0010284 STRU5821572 51308 P1 40RF E -17.8 EF	0010084 12 STRU5821232 24485 P1 40RF E -26.1 F1 38 J 1	0010184 7 UESU4821785 23845 P2 45HC E YARD	0010384 8 CRSU0409844 36385 P2 45HC E D3 14 B 2	0010584 11 UESU4820650 28601 P2 45HC E D3 14 C 2
0010682 GESU9287956 60468 P1 40RF E -3.9 EF	0010482 GESU9114400 66306 P1 40RF E -1.1 EF	0010282 SEGU9175734 28400 P1 40RF E +0.0 EF	0010082 4 GESU9104870 45988 P1 40RF E -23.3 YARD	0010182 6 IKSU4520040 57726 P2 45HC E D3 14 B 3	0010382 9 CRSU0401118 58087 P2 45HC E D3 14 B 1	0010582 10 CRSU0410969 42765 P2 45HC E D3 14 C 3

Appendix 1 **Final Stow Plan with reported container lashings marked**

EL FARO 185S

JAX

Load Bay 002 OD

Appendix 1

Final Stow Plan with reported container lashings marked

EL FARO 185S

JAX

Load Bay 003 OD

14x40EF

0030886	0030686	0030486	0030286	0030086	0030186	0030386	0030586	0030786
0030884 **STRU5821417** 63848 P1 40RF E -17.8 EF	0030684 **SEGU9070332** 49668 P1 40RF E -2.2 EF	0030484 **SEGU9070800** 64507 P1 40RF E -3.9 EF	0030284 **SEGU9071128** 46306 P1 40RF E +5.6 EF	0030084	0030184	0030384 **STRU5818136** 55587 P1 40RF E +1.1 EF	0030584 **STRU5821741** 54648 P1 40RF E +8.9 EF	0030784 **SEGU9070796** 68187 P1 40RF E -2.2 EF
0030882 **GESU9375846** 57748 P1 40RF E +2.2 EF	0030682 **STRU5819549** 66445 P1 40RF E +2.8 EF	0030482 **SEGU9029956** 52527 P1 40RF E +1.7 EF	0030282 **GESU9103093** 71716 P1 40RF E +1.7 EF	0030082	0030182	0030382 **STRU5822898** 63749 P1 40RF E -2.8 EF	0030582 **SEGU9070775** 64487 P1 40RF E -2.8 EF	0030782 **GESU9278147** 52726 P1 40RF E +2.3 EF

EL FARO 185S

JAX

Load Bay 006 OD

1 X 45'(1 X RFR)

4 x 45RF
18 x 40RF
22

0061088	0060888	0060688	0060488	0060288	0060088	0060188	0060388	0060588	0060788	0060988
0061086	0060886	0060686	0060486	0060286	0060086	0060186	0060386	0060586	0060786	0060986
0061084 STRU9500544 50806 P1 45RF E +1.1 EF	0060884 [1] STRU5452617 35823 P1 45RF E -26.1 YARD	0060684 GESU9287703 49567 P1 40RF E -1.1 EF	0060484 STRU5818394 37476 P1 40RF E +1.1 EF	0060284 GESU9438857 46006 P1 40RF E +1.1 EF	0060084 GESU9290918 46586 P1 40RF E -17.8 EF	0060184 SEGU9217172 48927 P1 40RF E -17.8 EF	0060384 SEGU9070501 67228 P1 40RF E -23.3 EF	0060584 SEGU9029581 63447 P1 40RF E -2.8 EF	0060784 SEGU9176181 53085 P1 40RF E +15.6 EF	0060984 SEGU9029447 55568 P1 40RF E +3.3 EF
0061082 STRU9500159 64765 P1 45RF E +1.7 EF	0060882 STRU5452772 60047 P1 45RF E +1.1 EF	0060682 GESU9287663 70167 P1 40RF E -2.2 EF	0060482 GESU9287072 52146 P1 40RF E +2.2 EF	0060282 STRU9000256 41727 P1 40RF E +1.1 EF	0060082 SEGU9070097 55788 P1 40RF E +1.7 EF	0060182 SEGU9028878 52186 P1 40RF E +1.1 EF	0060382 SEGU9029405 45839 P1 40RF E +1.1 EF	0060582 SEGU9029468 51388 P1 40RF E -17.8 EF	0060782 SEGU9029920 65446 P1 40RF E -2.8 EF	0060982 SEGU9029262 55587 P1 40RF E +1.7 EF

EL FARO 185S

JAX

Load Bay 007 OD

Final Stow Plan with reported container lashings marked

0071288	0071088	0070888	0070688	0070488	0070288	0070188	0070388	0070588	0070788	0070988	0071188
0071286	0071086	0070886	0070686	0070486	0070286	0070186	0070386	0070586	0070786	0070986	0071186
0071284 **STRU3200133** 12511 P1 20DC E EF	0071084 **FCIU2213685** 22611 P1 20DC E EF	0070884	0070684	0070484	0070284	0070184	0070384	0070584	0070784	0070984	0071184
0071282 **LNDU8401571** 66624 P1 20TK E 2.2 EF	0071082 **IDFU3242840** 66326 P1 20RT E -17.8 EF	0070882 **STRU3200030** 2252 P1 20DC E EF	0070682	0070482	0070282 **WCGU0002310** 43623 P1 20TK E 2.2 EF	0070182	0070382	0070582	0070782	0070982	0071182

Appendix 1 **Final Stow Plan with reported container lashings marked**

EL FARO 185S

JAX

Load Bay 008 OD

24 x 40RF
12 x 40HC
36

0081288	0081088	0080888	0080688	0080488	0080288	0080188	0080388	0080588	0080788	0080988	0081188
0081286 FCIU8841009 25327 P1 40HC E EF	0081086 UETU5288627 28786 P1 40HC E 0 EF	0080886 CAIU9046724 23869 P1 40HC E 0 EF	0080686 FSCU6144703 24467 P1 40HC E 0 EF	0080486 IKSU4352394 28905 P1 40HC E EF	0080286 BMOU4598783 28085 P1 40HC E 0 EF	0080186 UETU5290521 29646 P1 40HC E EF	0080386 CRSU9255349 20884 P1 40HC E 0 EF	0080586 STRU4094648 29487 P1 40HC E 0 EF	0080786 IKSU4341189 18667 P1 40HC E EF	0080986 CAIU8108457 27827 P1 40HC E EF	0081186 CAIU8040681 12465 P1 40HC E EF
0081284 STRU5819765 41266 P1 40RF E -17.8 EF	0081084 SEGU9175930 13986 P1 40RF E +20.0 EF	0080884 SEGU9070693 29886 P1 40RF E -26.1 EF	0080684 SEGU9071030 27287 P1 40RF E -26.1 EF	0080484 SEGU9176875 15726 P1 40RF E +20.0 EF	0080284 STRU5817335 30109 P1 40RF E -26.1 EF	0080184 STRU5823831 27847 P1 40RF E -26.1 EF	0080384 STRU5818835 25247 P1 40RF E +25.0 EF	0080584 GESU9383543 39566 P1 40RF E +12.8 EF	0080784 GESU9101017 41107 P1 40RF E +1.1 EF	0080984 SEGU9176880 26606 P1 40RF E +1.1 EF	0081184 SEGU9071386 27807 P1 40RF E -26.1 EF
0081282 SEGU9071302 49425 P1 40RF E -2.8 EF	0081082 STRU5894394 53325 P1 40RF E +2.2 EF	0080882 GESU9288090 54507 P1 40RF E +1.1 EF	0080682 SEGU9071088 43147 P1 40RF E +5.6 EF	0080482 GESU9562446 44566 P1 40RF E -17.8 EF	0080282 GESU9101193 31667 P1 40RF E -26.1 EF	0080182 SEGU9071025 46407 P1 40RF E -23.3 EF	0080382 GESU9101510 51105 P1 40RF E +1.1 EF	0080582 STRU5821422 49847 P1 40RF E +1.1 EF	0080782 GESU9566415 52867 P1 40RF E +1.1 EF	0080982 GESU9562620 48647 P1 40RF E -1.1 EF	0081182 SEGU9070651 30887 P1 40RF E -26.1 EF

Appendix 1

Final Stow Plan with reported container lashings marked

EL FARO 185S

JAX

Load Bay 010 OD

2 X 45'

1 X 40HC
21 X 45RE
1 X 40RE
12 X 45HC
36

0101288	0101088	0100888	0100688	0100488	0100288	0100188	0100388	0100588	0100788	0100988	0101188
0101286 GIPU4365815 32205 P1 40HC E EF	0101086 STRU4550537 34983 P1 45HC E EF	0100886 UESU4821126 26784 P1 45HC E EF	0100686 STRU6576438 31345 P1 45HC E EF	0100486 CRSU0405936 33925 P1 45HC E EF	0100286 CRSU0402937 15966 P1 45HC E EF	0100186 CRSU0407543 32024 P1 45HC E EF	0100386 IKSU4521895 27426 P1 45HC E EF	0100586 STRU6576633 29247 P1 45HC E EF	0100786 STRU6577882 31187 P1 45HC E EF	0100986 5 CRSU0408278 30726 P2 45HC E YARD	0101186 6 IKSU4528890 24692 P1 45HC E EF
0101284 CRSU9003218 29326 P1 40HC E EF	0101084 STRU9500924 37084 P1 45RF E -26.1 EF	0100884 STRU9502043 41467 P1 45RF E +1.1 EF	0100684 STRU5452896 29657 P1 45RF E +12.8 EF	0100484 STRU5452622 41767 P1 45RF E +1.1 EF	0100284 STRU9500225 43665 P1 45RF E +1.1 EF	0100184 STRU9502378 33285 P1 45RF E +21.1 EF	0100384 STRU9500930 43385 P1 45RF E +1.1 EF	0100584 STRU9502212 42946 P1 45RF E +1.1 EF	0100784 STRU9502070 34643 P1 45RF E +1.1 EF	0100984 CRSU0411590 25225 P2 45HC E EF	0101184 STRU9500138 45845 P1 45RF E +1.1 EF
0101282 GESU9287010 54926 P1 40RF E +4.7 EF	0101082 STRU9501767 42505 P1 45RF E +1.1 EF	0100882 STRU9502254 50885 P1 45RF E +1.1 EF	0100682 STRU9501601 59964 P1 45RF E +11.1 EF	0100482 STRU9501448 43065 P1 45RF E +1.1 EF	0100282 STRU9501366 51145 P1 45RF E +1.1 EF	0100182 STRU9501052 53484 P1 45RF E +1.1 EF	0100382 STRU9500729 46445 P1 45RF E +1.1 EF	0100582 STRU5453172 45667 P1 45RF E +1.1 EF	0100782 STRU9500523 51006 P1 45RF E +7.2 EF	0100982 STRU9500420 55325 P1 45RF E +2.2 EF	0101182 STRU5452387 48727 P1 45RF E +7.2 EF

EL FARO 185S

JAX

Load Bay 012 OD

12 x 53 HC
15 x 40 HC
6 x 45 HC
33

0121288	0121088	0120888	0120688	0120488	0120288	0120088	0120188	0120388	0120588	0120788	0120988	0121188
0121286	0121086 STRU8334407 19864 P1 53HC E EF	0120886 STRU8332641 38308 P1 53HC E 0,2,3 EF	0120686 STRU8333822 29125 P1 53HC E 0 EF	0120486 STRU8332549 22705 P1 53HC E EF	0120286 CRSU0402731 28605 P1 45HC E EF	0120086	0120186 CRSU0408010 27467 P1 45HC E 0 EF	0120386 FSCU6847666 20880 P1 40HC E 0 EF	0120586 STRU4093831 32864 P1 40HC E 0 EF	0120786 TCNU9798237 27646 P1 40HC E 0 EF	0120986 UETU5290542 33486 P1 40HC E EF	0121186 FCIU8465874 17428 P1 40HC E EF
0121284	0121084 STRU8332662 35325 P1 53HC E 0,2,3 EF	0120884 STRU8333843 31645 P1 53HC E 0 EF	0120684 STRU8331753 33146 P1 53HC E EF	0120484 STRU8332153 29586 P1 53HC E EF	0120284 STRU6577558 41965 P1 45HC E 0,3 EF	0120084	0120184 IKSU4528797 25064 P1 45HC E EF	0120384 IKSU4335139 29926 P1 40HC E EF	0120584 FCIU8094310 35806 P1 40HC E EF	0120784 STRU4094627 44708 P1 40HC E 0 EF	0120984 GLDU7330751 35166 P1 40HC E EF	0121184 FSCU9140091 25666 P1 40HC E 0 EF
0121282	0121082 STRU8333756 55726 P1 53HC E 0 EF	0120882 STRU8333761 46088 P1 53HC E 0 EF	0120682 STRU8334602 46165 P1 53HC E 0,2,3 EF	0120482 STRU8331305 49688 P1 53HC E 0 EF	0120282 IKSU4523603 47525 P1 45HC E 0 EF	0120082	0120182 CRSU0408283 52986 P1 45HC E 0 EF	0120382 GIPU4366827 39326 P1 40HC E EF	0120582 CRSU9254466 51687 P1 40HC E 3,6 EF	0120782 TCLU8149540 47047 P1 40HC E 0 EF	0120982 GESU4586194 48048 P1 40HC E EF	0121182 FSCU9886835 33887 P1 40HC E EF

Appendix 1

Final Stow Plan with reported container lashings marked

EL FARO 185S

JAX

Load Bay 013 OD

24 x 40RF
12 x 40HC
36

0131288	0131088	0130888	0130688	0130488	0130288	0130188	0130388	0130588	0130788	0130988	0131188
0131286 FSCU6668830 35486 P1 40HC E EF	0131086 STRU4095916 43704 P1 40HC E EF	0130886 TCNU9123439 33466 P1 40HC E EF	0130686 STRU4094165 31266 P1 40HC E EF	0130486 UESU5252364 31885 P1 40HC E EF	0130286 GESU6212932 29167 P1 40HC E EF	0130186 CAIU8199903 16726 P1 40HC E EF	0130386 BMOU4601275 21546 P1 40HC E EF	0130586 CAIU8151480 24846 P1 40HC E EF	0130786 GESU6623342 25785 P1 40HC E EF	0130986 FSCU6965268 30807 P1 40HC E EF	0131186 FSCU9233722 18144 P1 40HC E EF
0131284 STRU5817422 26566 P1 40RF E -23.3 EF	0131084 STRU5819488 33325 P1 40RF E +1.1 EF	0130884 GESU9319251 32247 P1 40RF E +1.1 EF	0130684 GESU9340789 21727 P1 40RF E +1.1 EF	0130484 STRU5821802 30406 P1 40RF E +1.1 EF	0130284 SEGU9070944 33680 P1 40RF E +1.7 EF	0130184 SEGU9217423 48927 P1 40RF E +1.1 EF	0130384 GESU9436978 37567 P1 40RF E +1.1 EF	0130584 GESU9114462 26548 P1 40RF E +1.1 EF	0130784 STRU5821485 48608 P1 40RF E +5.6 EF	0130984 GESU9318152 32609 P2 40RF E +3.3 EF	0131184 SEGU9070311 29366 P2 40RF E +1.7 EF
0131282 SEGU9028712 46147 P1 40RF E -2.2 EF	0131082 SEGU9029786 44348 P1 40RF E +1.1 EF	0130882 GESU9379760 44727 P1 40RF E +0.0 EF	0130682 GESU9101275 54705 P1 40RF E +4.4 EF	0130482 SEGU9029560 52488 P1 40RF E +3.3 EF	0130282 GESU9312534 45206 P1 40RF E -17.8 EF	0130182 GESU9287880 49366 P1 40RF E +1.7 EF	0130382 STRU5822814 50246 P1 40RF E +1.1 EF	0130582 GESU9291257 49247 P1 40RF E -17.8 EF	0130782 SEGU9071405 43427 P1 40RF E +1.1 EF	0130982 GESU9102076 36965 P2 40RF E -17.8 EF	0131182 GESU9307712 40327 P2 40RF E +1.7 EF

EL FARO 185S

JAX

Load Bay 014 OD

12 x 53 HC
6 x 48 HC
15 x 45 HC
33

0141288	0141088	0140888	0140688	0140488	0140288	0140088	0140188	0140388	0140588	0140788	0140988	0141188
0141286	0141086 STRU8332929 44306 P1 53HC E 0 EF	0140886 STRU8334562 36866 P1 53HC E 0,8 EF	0140686 STRU8334752 35724 P1 53HC E 3 EF	0140486 STRU4884703 38806 P1 48HC E EF	0140286 STRU8334351 24324 P1 53HC E EF	0140086 STRU4884088 25324 P1 48HC E EF	0140186 UESU4825667 34326 P1 45HC E EF	0140386 CZZU0400267 24207 P2 45HC E EF	0140586 IKSU4527255 45226 P1 45HC E EF	0140786 CRSU0409741 36427 P1 45HC E 0 EF	0140986 CRSU0407029 15199 P2 45HC E EF	0141186
0141284	0141084 STRU8334710 23686 P1 53HC E EF	0140884 STRU8334789 30607 P1 53HC E EF	0140684 STRU8331727 34926 P1 53HC E EF	0140484 STRU4885084 29385 P1 48HC E EF	0140284 STRU8330280 27844 P2 53HC E EF	0140084 STRU4884051 26544 P1 48HC E EF	0140184 STRU6571159 24026 P1 45HC E 0 EF	0140384 IKSU4528713 43444 P1 45HC E EF	0140584 IKSU4524929 25966 P1 45HC E 0 EF	0140784 IKSU4520707 22386 P1 45HC E EF	0140984 CZZU0403184 41046 P1 45HC E EF	0141184
0141282	0141082 STRU8332533 47247 P1 53HC E 0,2,1 EF	0140882 STRU8331645 37335 P1 53HC E EF	0140682 STRU8332220 32501 P1 53HC E EF	0140482 STRU4885166 46925 P1 48HC E 8 EF	0140282 STRU8332240 46987 P2 53HC E EF	0140082 STRU4886408 65246 P1 48EH E 0,1,4 EF	0140182 IKSU4521154 61165 P1 45HC E EF	0140382 CRSU0405577 49247 P1 45HC E EF	0140582 CRSU0404544 43724 P1 45HC E 0,3,5 EF	0140782 IKSU4529598 48625 P1 45HC E 0,1,9 EF	0140982 STRU6576145 52627 P1 45HC E EF	0141182

Appendix 1

Final Stow Plan with reported container lashings marked

EL FARO 185S

JAX

Load Bay 015 OD

24 x 40RF
12 x 40HC
36

0151288	0151088	0150888	0150688	0150488	0150288	0150188	0150388	0150588	0150788	0150988	0151188
0151286 **GESU6581421** 25565 P1 40HC E 0 EF	0151086 **BMOU4599368** 49586 P1 40HC E 8 EF	0150886 **GESU6623527** 30955 P1 40HC E EF	0150686 **STRU4093338** 26727 P2 40HC E EF	0150486 **BHCU4965860** 34906 P1 40HC E 0 EF	0150286 **BMOU4601594** 28726 P2 40HC E EF	0150186 **CAIU8248248** 32827 P2 40HC E EF	0150386 **FCIU8352482** 22447 P2 40HC E EF	0150586 **GLDU7386616** 17906 P1 40HC E EF	0150786 **FCIU8245057** 18514 P1 40HC E 0,2, EF	0150986 **BMOU4592698** 26164 P1 40HC E EF	0151186 **IKSU4346982** 36246 P1 40HC E 0,8 EF
0151284 **SEGU9217064** 46705 P1 40RF E +15.6 EF	0151084 **SEGU9070760** 21226 P1 40RF E +18.3 EF	0150884 **GESU9343200** 24467 P1 40RF E +18.3 EF	0150684 **GESU9102878** 38605 P1 40RF E 0 +1.1 EF	0150484 **GESU9287180** 29965 P1 40RF E -2.2 EF	0150284 **GESU9288994** 25159 P1 40RF E -23.3 EF	0150184 **SEGU9217151** 45847 P1 40RF E -23.3 EF	0150384 **GESU9288504** 51546 P1 40RF E +3.3 EF	0150584 **SEGU9028902** 50667 P1 40RF E -23.3 EF	0150784 **GESU9286862** 39666 P1 40RF E -23.3 EF	0150984 **GESU9100962** 31806 P1 40RF E +2.2 EF	0151184 **GESU9375743** 29546 P1 40RF E +1.1 EF
0151282 **GESU9288356** 44507 P1 40RF E 0 +1.1 EF	0151082 **GESU9288939** 47909 P1 40RF E 0 +1.1 EF	0150882 **GESU9102179** 36647 P1 40RF E -23.3 EF	0150682 **GESU9287621** 33027 P1 40RF E 0 +1.1 EF	0150482 **GESU9104269** 53786 P1 40RF E +2.2 EF	0150282 **SEGU9070034** 35627 P1 40RF E -23.3 EF	0150182 **GESU9287299** 41167 P1 40RF E -17.8 EF	0150382 **GESU9565240** 45808 P1 40RF E +1.1 EF	0150582 **STRU5817361** 51487 P1 40RF E -17.8 EF	0150782 **GESU9287642** 52287 P1 40RF E +2.2 EF	0150982 **GESU9101125** 52765 P1 40RF E +3.3 EF	0151182 **GESU9562718** 53447 P1 40RF E +3.3 EF

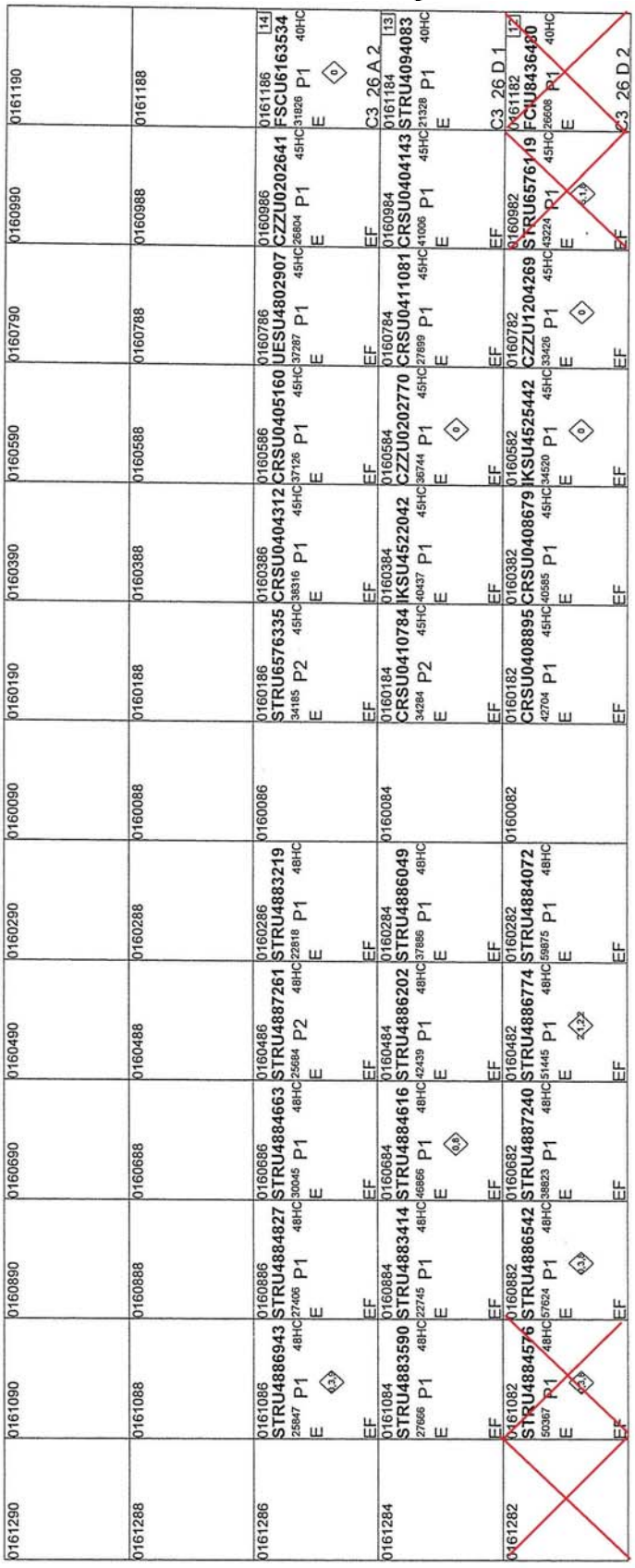
Appendix 1 **Final Stow Plan with reported container lashings marked**

EL FARO 185S

JAX

Load Bay 016 OD

3 X 40'



Spinnaker 6.0.0.307

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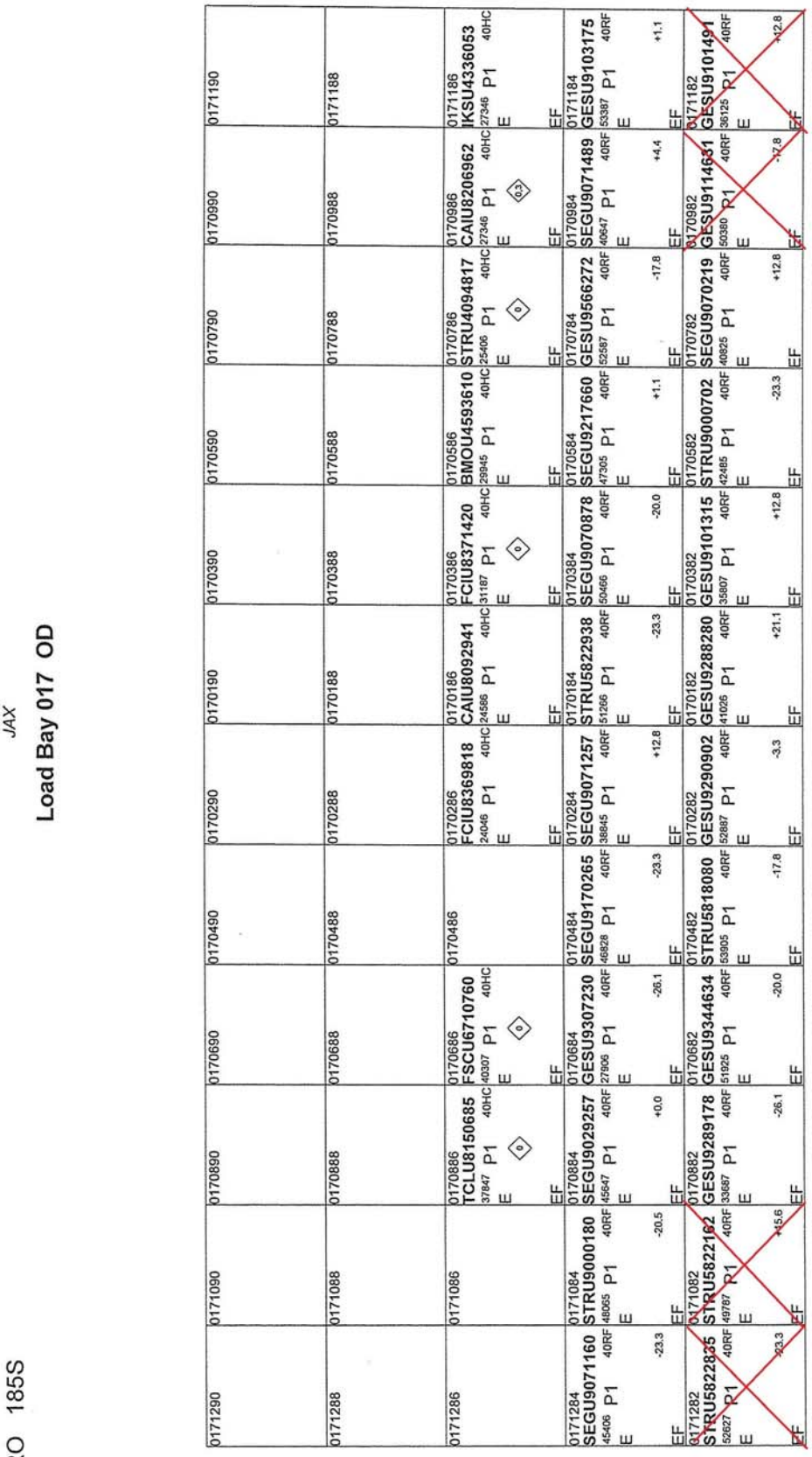
Load Bay 016 OD

Appendix 1 **Final Stow Plan with reported container lashings marked**



Appendix 1

Final Stow Plan with reported container lashings marked

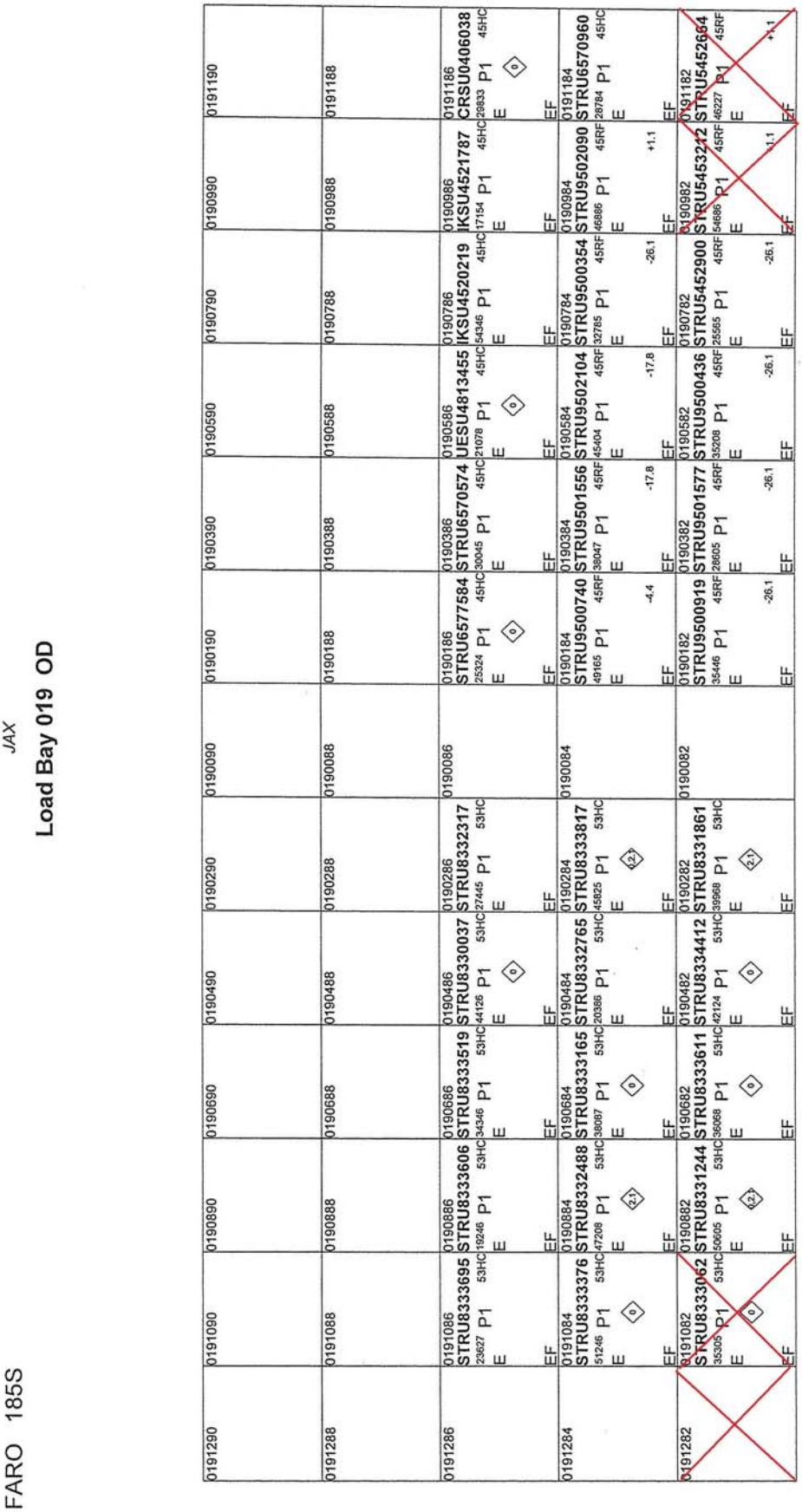
EL FARO 185S

JAX

Load Bay 018 OD

0181290	0181090	0180890	0180690	0180490	0180290	0180190	0180390	0180590	0180790	0180990	0181190
0181288	0181088	0180888	0180688	0180488	0180288	0180188	0180388	0180588	0180788	0180988	0181188
0181286	0181086	0180886	0180686	0180486	0180286	0180186	0180386	0180586	0180786	0180986	0181186
0181284 CRSU9250007 38047 P1 40HC E EF	0181084 IKSU4339350 33660 P1 40HC E EF	0180884 BMOU4597935 23565 P1 40HC E EF	0180684	0180484 CAXU8015187 34807 P1 40HC E 2.2 EF	0180284 CAIU8148552 47327 P1 40HC E 0.8 EF	0180184 GESU9103370 50746 P1 40RF E -17.8 EF	0180384 STRU4095665 42225 P1 40HC E EF	0180584 STRU4093512 35228 P1 40HC E EF	0180784 CRSU9252611 61471 P1 40HC E EF	0180984 GIPU4364892 46747 P1 40HC E EF	0181184 GESU6210230 21738 P1 40HC E 3 EF
0181282 STRU5821171 47847 P1 40RF E +1.1 EF	0181082 STRU5808903 41447 HOT 40RF E -18.3 EF	0180882 SEGU9216793 56425 P1 40RF E -3.9 EF	0180682 STRU5818244 53866 P1 40RF E 0 +1.1 EF	0180482 SEGU9029792 41645 P1 40RF E +1.1 EF	0180282 GESU9288269 34586 P1 40RF E +1.1 EF	0180182 GESU9289223 53028 P1 40RF E -17.8 EF	0180382 SEGU9177660 53467 P1 40RF E +1.1 EF	0180582 GESU9308581 73427 P1 40RF E -17.8 EF	0180782 STRU5823955 54787 P1 40RF E +1.1 EF	0180982 GESU9307754 43208 P1 40RF E -17.8 EF	0181182 STRU5818434 67726 P1 40RF E -2.8 EF

Appendix 1 **Final Stow Plan with reported container lashings marked**



Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.224	70.11	2.197	34.771	76,657
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.224	70.11	2.197	33.580	74,031
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.224	70.11	2.197	32.468	71,580
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.224	70.11	2.197	31.427	69,285
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.224	70.11	2.197	30.451	67,133
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.224	70.11	2.197	29.534	65,111
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.224	70.11	2.197	28.670	63,207
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.224	70.11	2.197	27.856	61,411
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.224	70.11	2.197	27.086	59,715
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.224	70.11	2.197	26.358	58,110
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.224	70.11	2.197	25.668	56,588
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.224	70.11	2.197	25.013	55,145

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on Tote assumption of 45 degrees. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.1 for ROLOC box as specified in CSS Code for steel/steel (dry) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.

Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.186	67.9	1.825	28.420	62,656
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.186	67.9	1.825	27.595	60,836
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.186	67.9	1.825	26.815	59,118
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.186	67.9	1.825	26.079	57,494
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.186	67.9	1.825	25.382	55,957
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.186	67.9	1.825	24.721	54,500
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.186	67.9	1.825	24.094	53,117
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.186	67.9	1.825	23.497	51,803
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.186	67.9	1.825	22.930	50,552
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.186	67.9	1.825	22.389	49,360
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.186	67.9	1.825	21.874	48,223
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.186	67.9	1.825	21.381	47,137

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on Tote assumption of 45 degrees. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.0 for ROLOC box as specified in CSS Code for steel/steel (wet) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.

Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.224	56.22	2.197	27.882	61,470
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.224	56.22	2.197	26.927	59,364
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.224	56.22	2.197	26.035	57,398
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.224	56.22	2.197	25.201	55,559
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.224	56.22	2.197	24.418	53,833
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.224	56.22	2.197	23.683	52,212
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.224	56.22	2.197	22.990	50,685
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.224	56.22	2.197	22.337	49,245
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.224	56.22	2.197	21.720	47,884
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.224	56.22	2.197	21.136	46,597
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.224	56.22	2.197	20.583	45,377
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.224	56.22	2.197	20.058	44,220

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on NCB assumption of 60 degrees. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.1 for ROLOC box as specified in CSS Code for steel/steel (dry) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.

Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.186	53.55	1.825	22.414	49,415
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.186	53.55	1.825	21.763	47,979
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.186	53.55	1.825	21.148	46,624
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.186	53.55	1.825	20.567	45,343
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.186	53.55	1.825	20.018	44,131
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.186	53.55	1.825	19.496	42,982
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.186	53.55	1.825	19.002	41,892
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.186	53.55	1.825	18.532	40,855
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.186	53.55	1.825	18.084	39,868
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.186	53.55	1.825	17.658	38,928
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.186	53.55	1.825	17.251	38,032
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.186	53.55	1.825	16.862	37,175

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on NCB assumption of 60 degrees. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.0 for ROLOC box as specified in CSS Code for steel/steel (wet) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.

Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.224	63.94	2.197	31.711	69,910
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.224	63.94	2.197	30.625	67,516
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.224	63.94	2.197	29.611	65,280
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.224	63.94	2.197	28.662	63,188
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.224	63.94	2.197	27.771	61,225
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.224	63.94	2.197	26.935	59,381
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.224	63.94	2.197	26.147	57,645
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.224	63.94	2.197	25.404	56,007
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.224	63.94	2.197	24.703	54,460
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.224	63.94	2.197	24.038	52,996
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.224	63.94	2.197	23.409	51,608
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.224	63.94	2.197	22.812	50,292

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on angles shown in EL Heavy Weather Lashing Requirements. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.1 for ROLOC box as specified in CSS Code for steel/steel (dry) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.

Appendix 2

Maximum weight calculations for a range of speeds and various lashing angles

Maximum Weight of RORO Trailers for Off Button Securing in Hold 2A

Speed KTS	GM m	B/GM	F1	F2	f	Ay	B/GM corr	Fy/m	COF	Sec kN	COFxg	Max Mass mt	Max Mass lbs
19.0	1.31	21.37	0.438	0.241	0.680	6.2	1.00	4.214	0.186	61.52	1.825	25.750	56,769
19.5	1.31	21.37	0.450	0.241	0.691	6.2	1.00	4.285	0.186	61.52	1.825	25.002	55,119
20.0	1.31	21.37	0.461	0.241	0.703	6.2	1.00	4.357	0.186	61.52	1.825	24.296	53,563
20.5	1.31	21.37	0.473	0.241	0.714	6.2	1.00	4.428	0.186	61.52	1.825	23.628	52,092
21.0	1.31	21.37	0.484	0.241	0.726	6.2	1.00	4.500	0.186	61.52	1.825	22.997	50,699
21.5	1.31	21.37	0.496	0.241	0.737	6.2	1.00	4.571	0.186	61.52	1.825	22.398	49,379
22.0	1.31	21.37	0.507	0.241	0.749	6.2	1.00	4.643	0.186	61.52	1.825	21.830	48,126
22.5	1.31	21.37	0.519	0.241	0.760	6.2	1.00	4.714	0.186	61.52	1.825	21.290	46,936
23.0	1.31	21.37	0.531	0.241	0.772	6.2	1.00	4.786	0.186	61.52	1.825	20.775	45,802
23.5	1.31	21.37	0.542	0.241	0.783	6.2	1.00	4.857	0.186	61.52	1.825	20.286	44,722
24.0	1.31	21.37	0.554	0.241	0.795	6.2	1.00	4.929	0.186	61.52	1.825	19.818	43,692
24.5	1.31	21.37	0.565	0.241	0.807	6.2	1.00	5.000	0.186	61.52	1.825	19.372	42,708

Assumptions: Total of six lashing tensioners and chains (3 each side). Four Chains located forward on ROLOC box and two located on rear (wheels end) of RORO trailer. Lashing angles based on angles shown in EL Heavy Weather Lashing requirements. Coefficient of friction based on utilizing 0.3 for rear as specified in CSS Code for rubber/steel and 0.0 for ROLOC box as specified in CSS Code for steel/steel (wet) appropriately adjusted based on an assumed weight distribution for RORO trailer of 38/62. A rigid body is assumed and the coefficient of friction is considered uniform across the length of the cargo.