
No.97 Recommendation for UR S11.2.1.3, Rev. 5

(June
2007)

1. General guidance note regarding the use of UR S11.2.1.3 Rev. 5

This document is intended for guidance and interpretation of UR S11.2.1.3 Rev. 5, "Partially filled ballast tanks in ballast loading conditions".

Case A and B are generally applicable for ballast loading conditions for any cargo vessel which might have one BW Tank (or one pair of BW Tanks) partially filled.

For the vessel in Case C no partial filling of ballast tank is allowed during ballast voyage.

Case D is showing the conditions necessary for checking longitudinal strength for a conventional ore carrier with two pairs of large wing water ballast tanks partly filled during the ballast voyage.

In the Figures, the conditions only intended for strength verification (not operational) are marked with a star (*).

2. Case A, B and C.

Case A

Fig. 1 shows Case A, with a cargo vessel where partial filling of ballast water tank no. 6 (P/S) is permitted, and may take place at anytime during the ballast voyage. Intermediate condition(s) should be specified as shown in the Figure, however filling/partial filling of BW Tank no. 6 (P/S) may be done at any step to keep acceptable trim and propeller immersion during the ballast voyage.

To obtain full operational flexibility regarding the filling level of BW Tank no. 6 (P/S), loading conditions A2 (full at departure) * and A8 (empty at arrival)* shall be added for strength verification. Additional conditions (full and empty BW Tank no. 6 (P/S)) related to the intermediate conditions A3-A6 are not necessary as A2* and A8* will be the most critical one.

Case B

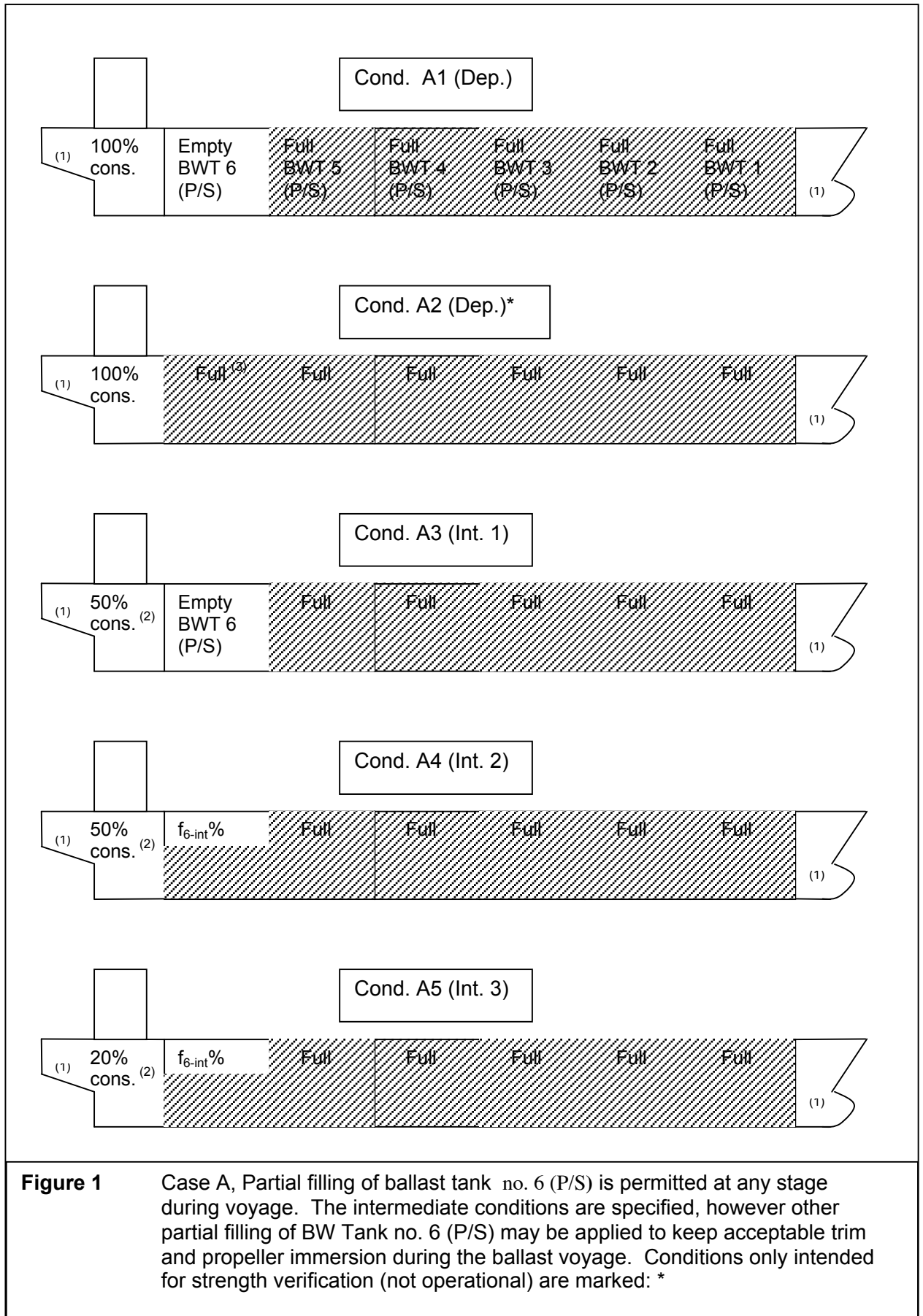
Fig. 2 shows Case B, where partial filling of BW Tank no. 6 (P/S) to a given level ($f_{6-int}\%$) will be done after a specified % consumables is reached, see conditions B2 and B3. Before this % consumables (shown as 50% in this Figure), BW Tank no. 6 (P/S) shall be kept empty. When reaching a given level of consumables (shown as 20% in Figure 2) BW Tank no. 6 (P/S) shall be kept full, see conditions B5 and B6. Two additional intermediate conditions (B4* and B6*) shall be added for longitudinal strength verification.

In order to categorize a vessel according to Case B, clear operational guidance for partial filling of ballast tanks, in association with the consumption level as shown in Figure 2, is to be given in the loading manual. If such operational guidance is not given, Case A is to be applied.

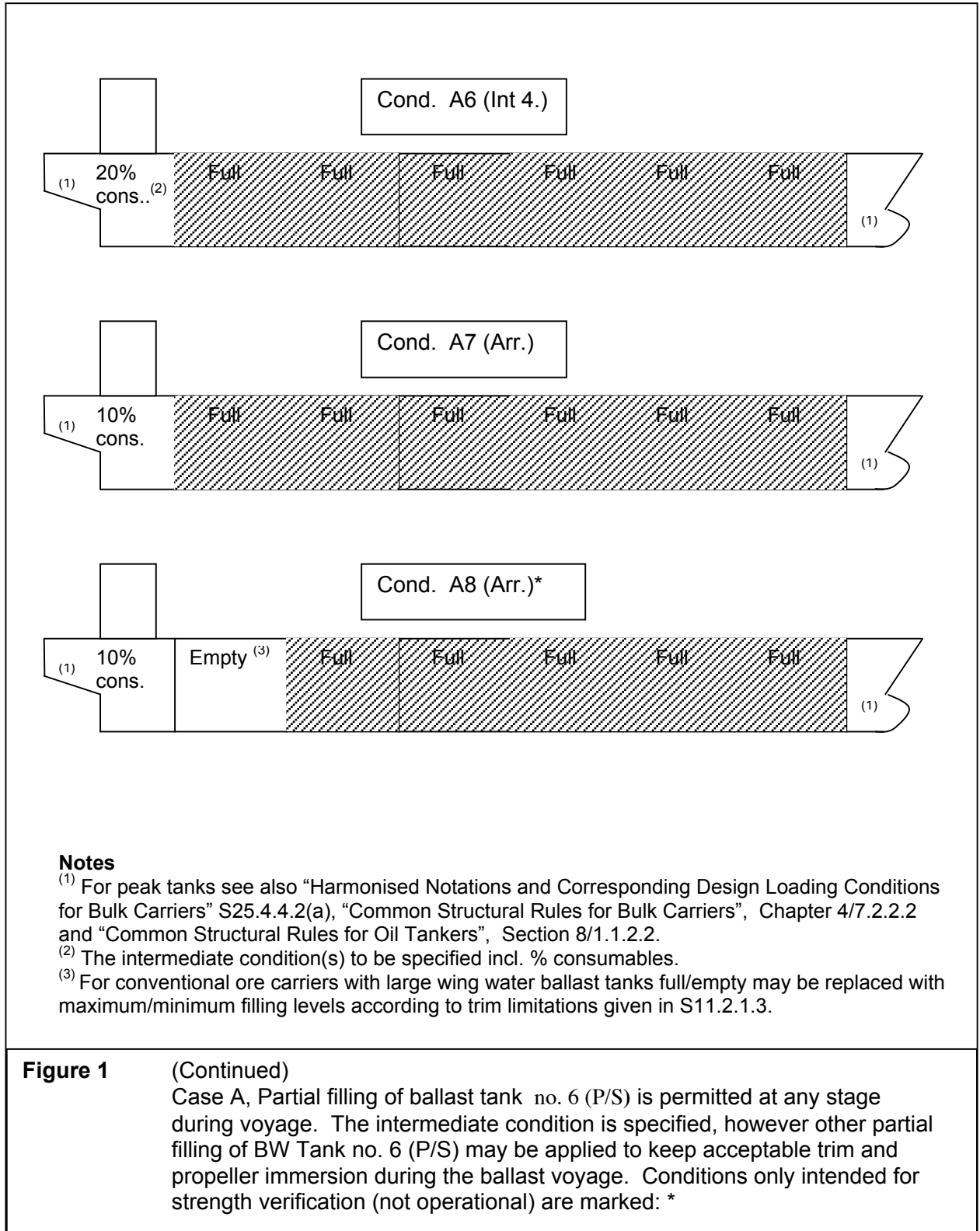
Case C

Fig. 3 shows Case C, with a cargo vessel where partial filling of any ballast water tank is not permitted. The two intermediate conditions given, define the % consumables at which filling of BW Tank no. 6 (P/S) should take place. No additional loading conditions are required.

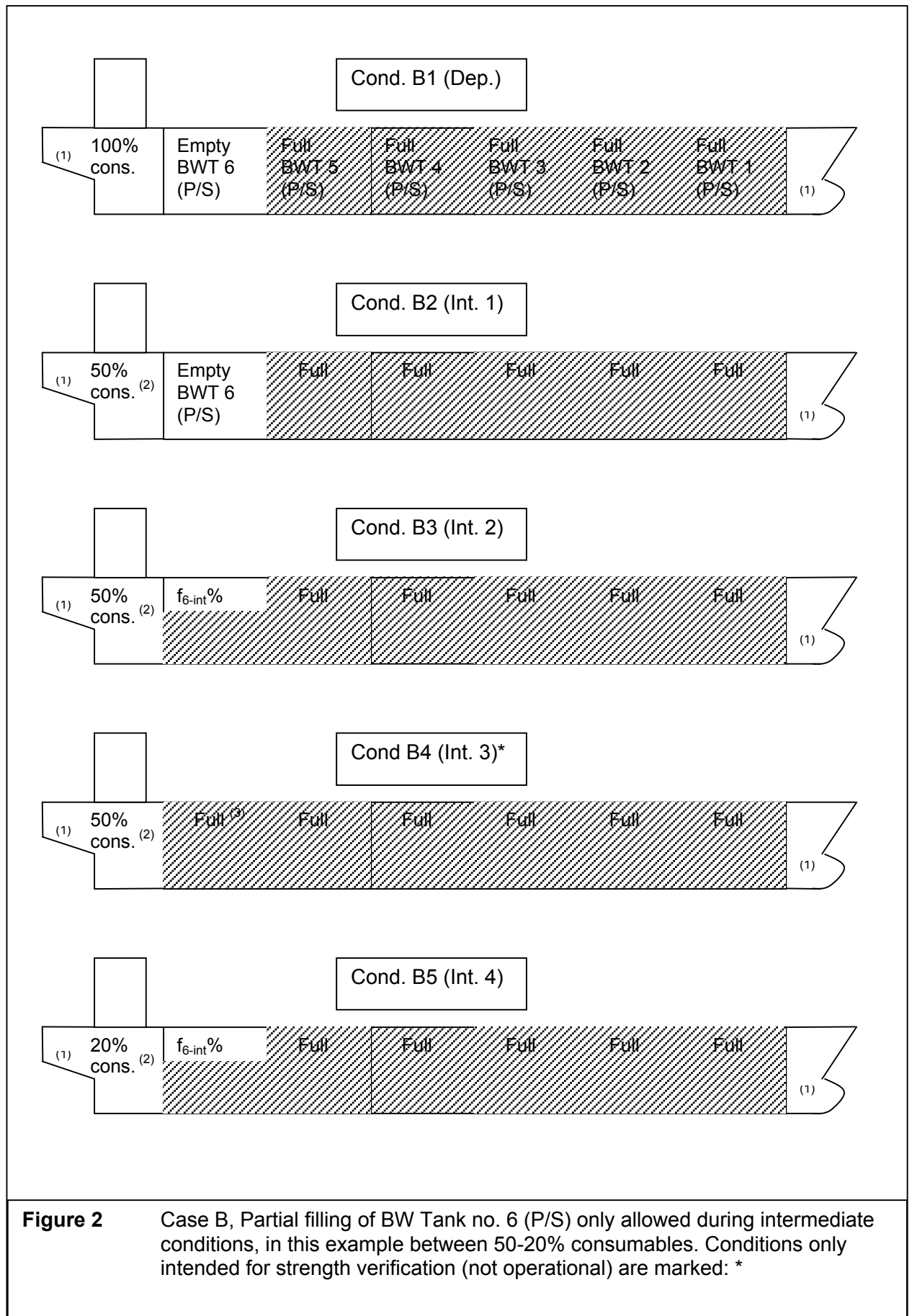
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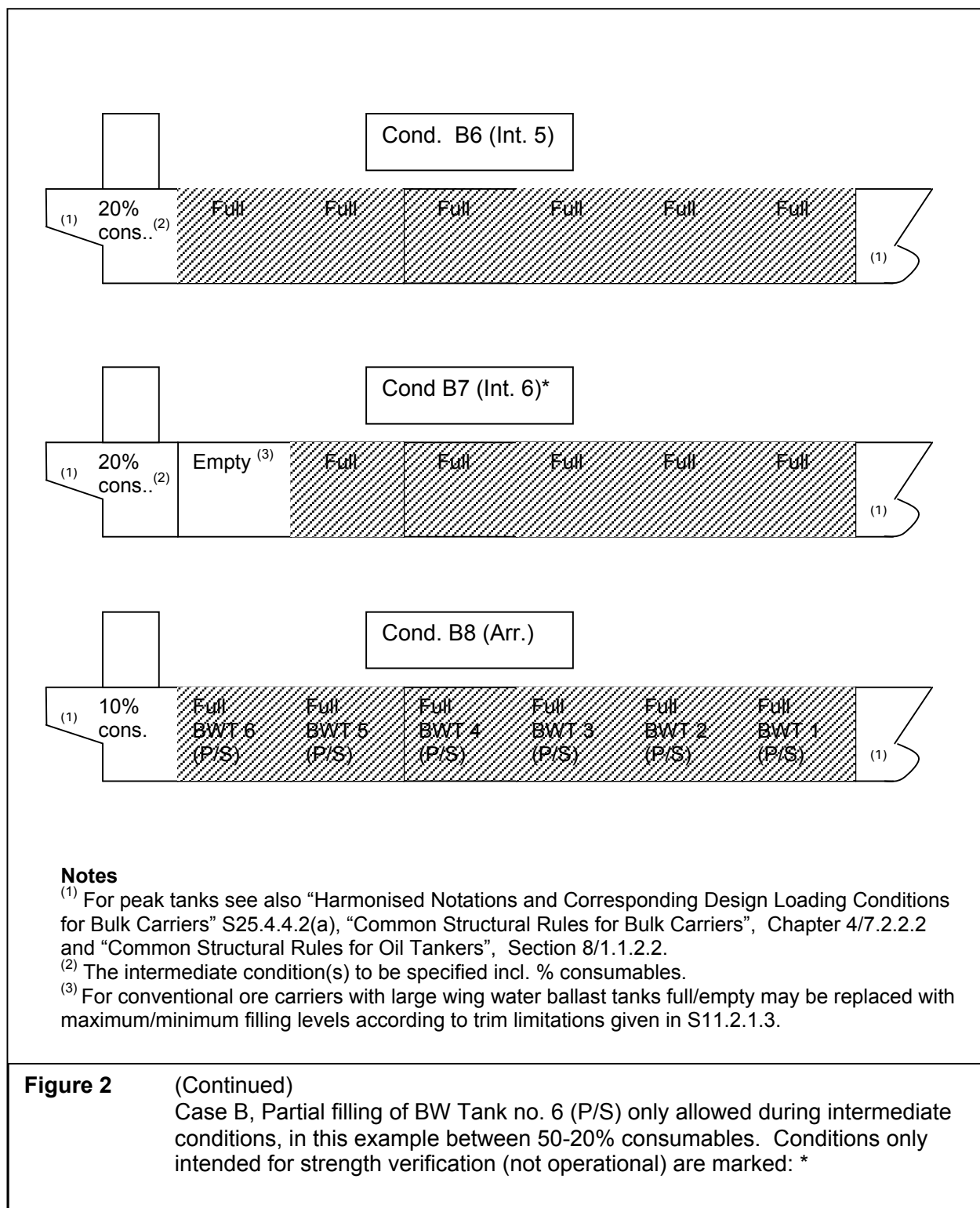


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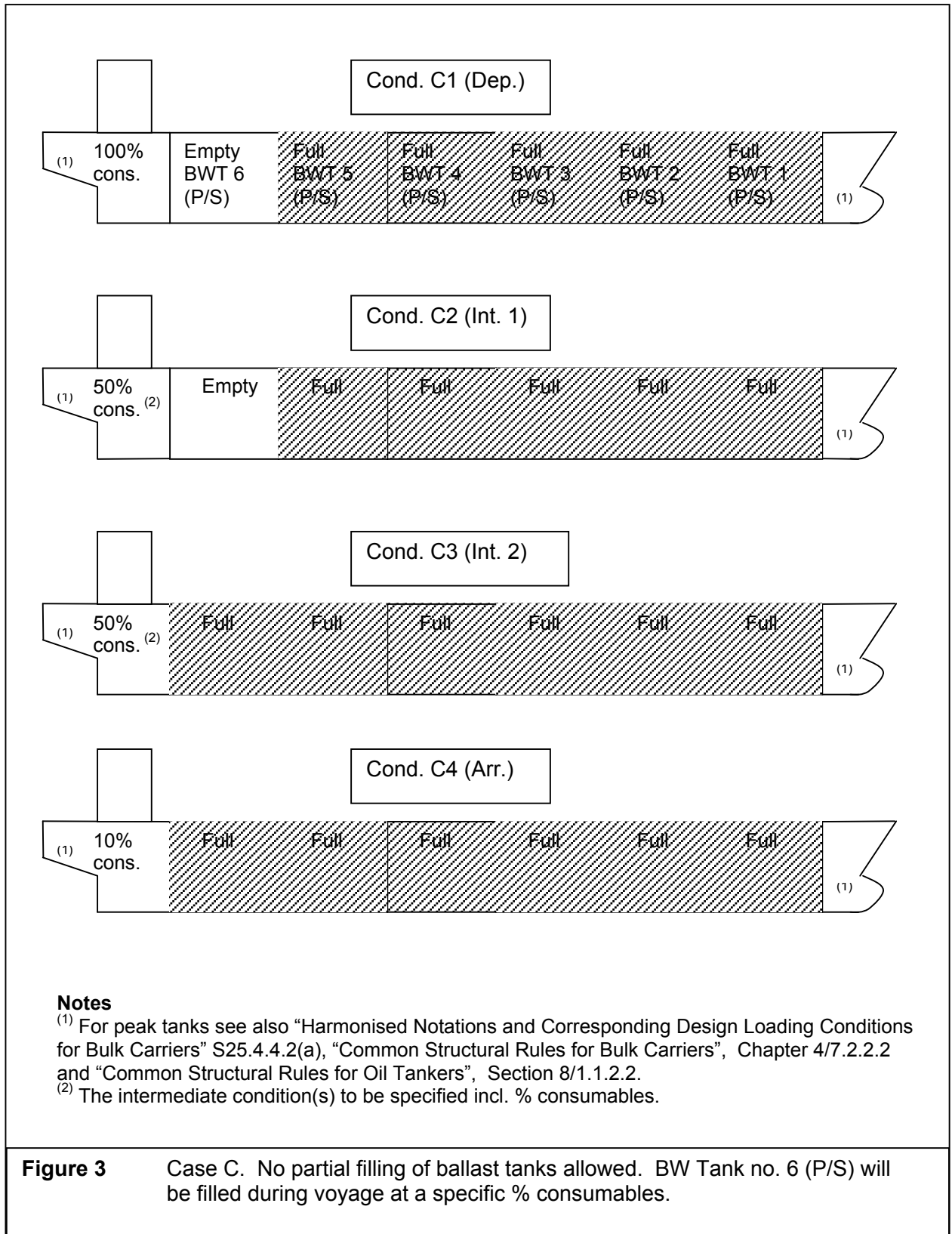


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3. Case D – Conventional ore carrier with two pairs of partially filled ballast water tanks

Fig. 4(a) show the operational loading conditions, departure condition (D1), four intermediate conditions (D2-D5) and arrival condition (D6), for an conventional ore carrier with partial filling of both BW tank no.1 (P/S) and 5 (P/S) during voyage.

Loading cond.	Consumables	Filling level, WBT 1(P/S)	Filling level, WBT 5(P/S)
D1 - Departure	100%	f_{1dep} %	f_{5dep} %
D2 – Intermediate 1	50% ⁽ⁱ⁾	f_{1dep} %	f_{5dep} %
D3 – Intermediate 2	50% ⁽ⁱ⁾	f_{1int} %	f_{5int} %
D4 – Intermediate 3	20% ⁽ⁱ⁾	f_{1int} %	f_{5int} %
D5 – Intermediate 4	20% ⁽ⁱ⁾	f_{1arr} %	f_{5arr} %
D6 - Arrival	10%	f_{1arr} %	f_{5arr} %

Note:

⁽ⁱ⁾ % consumables to be specified, indicated to 50% and 20 %

Table 1 Filling level in partially filled BW tanks nos.1 (P/S) and 5 (P/S) for the operational conditions during ballast voyage.

Fig. 4(b) and Fig. 4(c) show the additional twelve loading conditions (D1-1 ~ D1-12) which shall be added for longitudinal strength verification of the departure condition (D1).

Fig. 4(d) and Fig. 4(i) show the additional 32 loading conditions (D2-1 ~ D2-12, D3-1 ~ D3-4, D4-1 ~ D4-12 and D5-1 ~ D5-4) which shall be added for longitudinal strength verification of the intermediate conditions (D2 ~ D5).

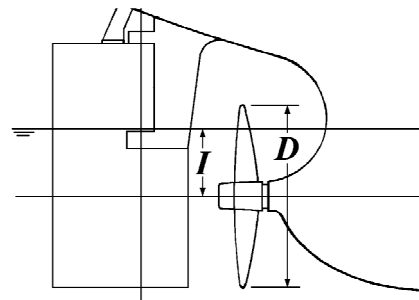
Fig. 4(j) and Fig. 4(k) show the additional twelve loading conditions (D6-1 ~ D6-12) which shall be added for longitudinal strength verification of the arrival condition (D6).

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For the additional loading conditions, the maximum and the minimum filling level of BW tank are according to trim and propeller immersion limitations given in S11.2.1.3:

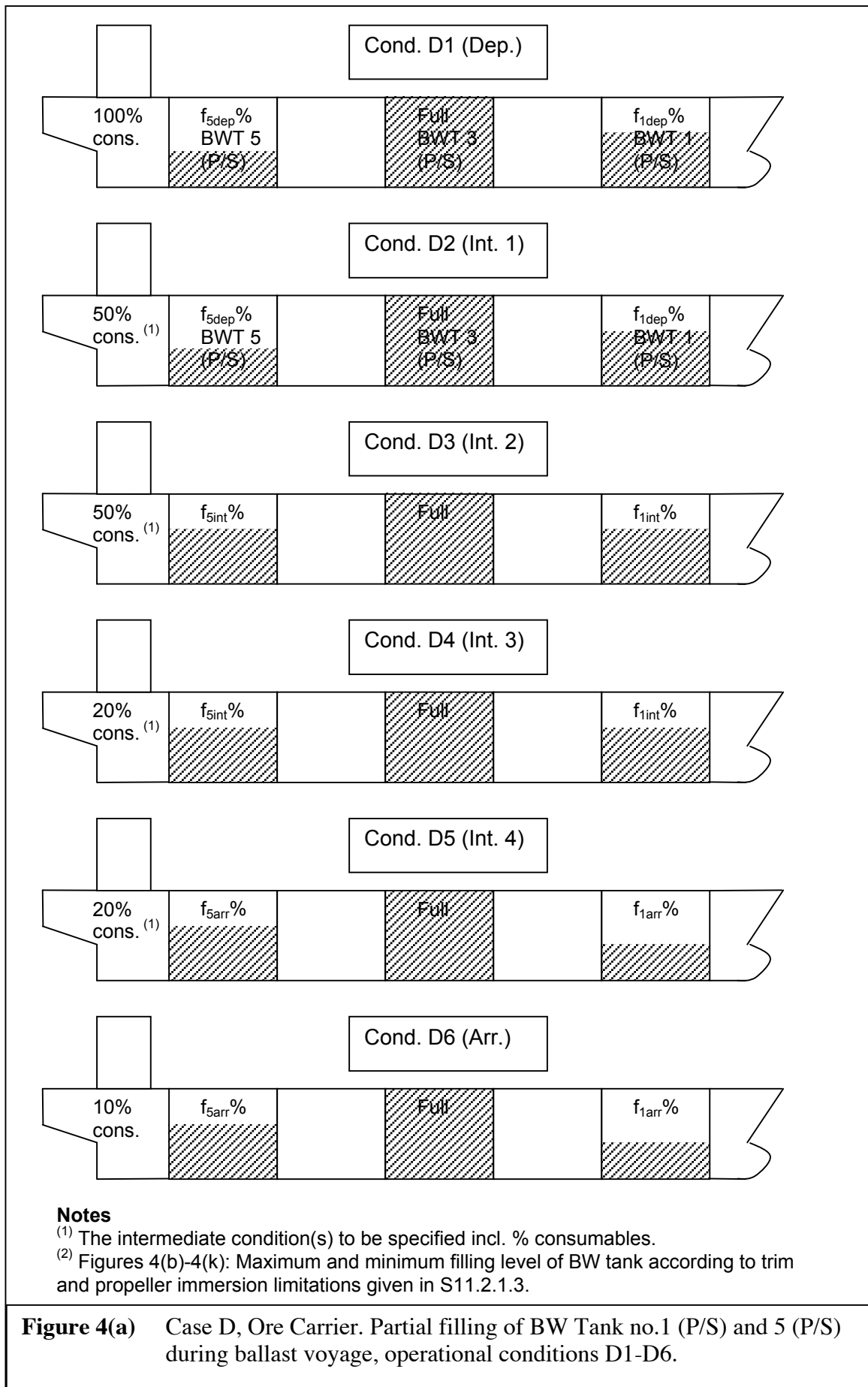
However, for conventional ore carriers with large wing water ballast tanks in cargo area, where empty or full ballast water filling levels of one or maximum two pairs of these tanks lead to the ship's trim exceeding one of the following conditions, it is sufficient to demonstrate compliance with maximum, minimum and intended partial filling levels of these one or maximum two pairs of ballast tanks such that the ship's condition does not exceed any of these trim limits. Filling levels of all other wing ballast tanks are to be considered between empty and full. The trim conditions mentioned above are:

- *trim by stern of 3% of the ship's length, or*
- *trim by bow of 1.5% of ship's length, or*
- *any trim that cannot maintain propeller immersion (I/D) not less than 25%, where;
 I = the distance from propeller centerline to the waterline
 D = propeller diameter
(see the following figure)*

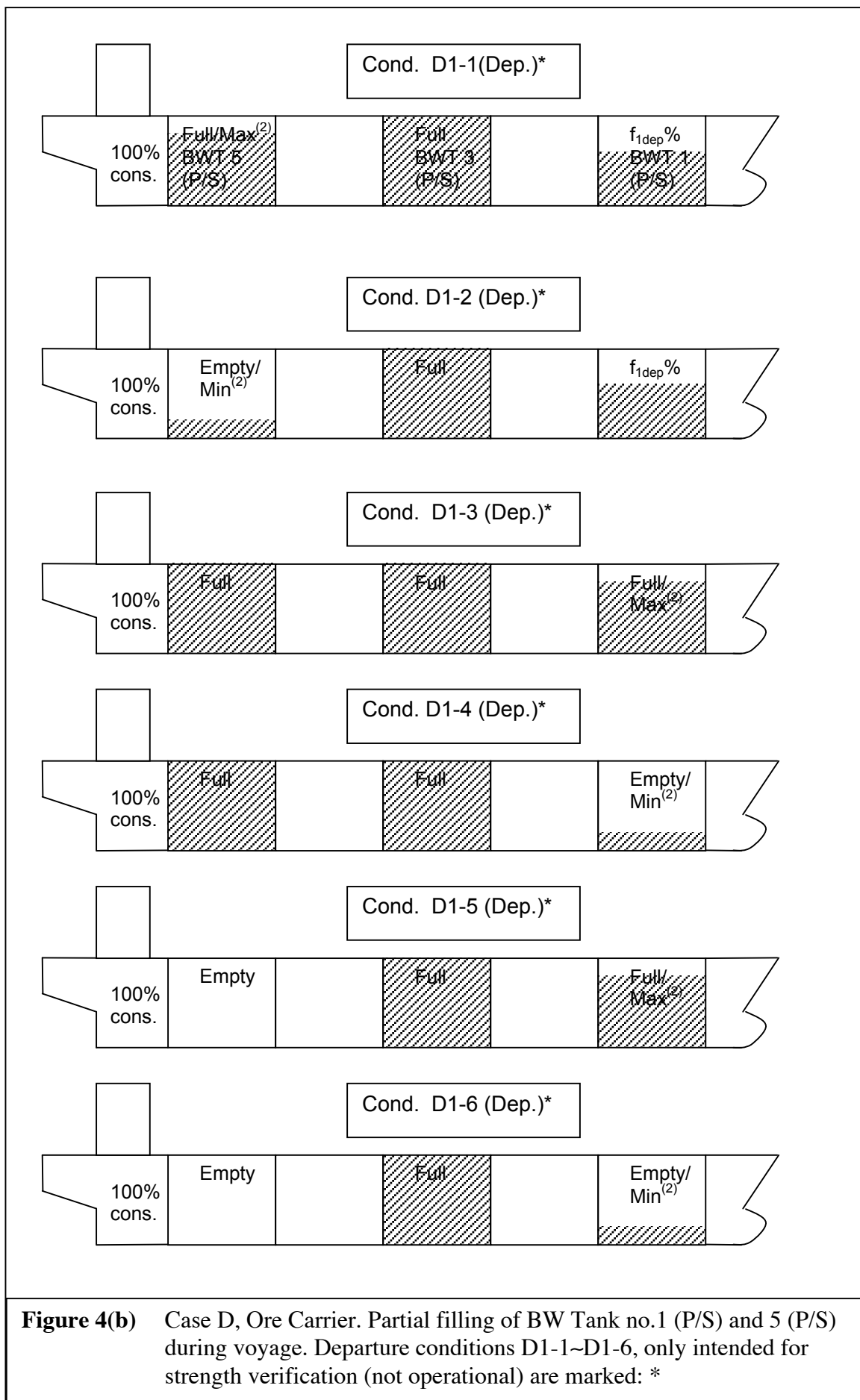


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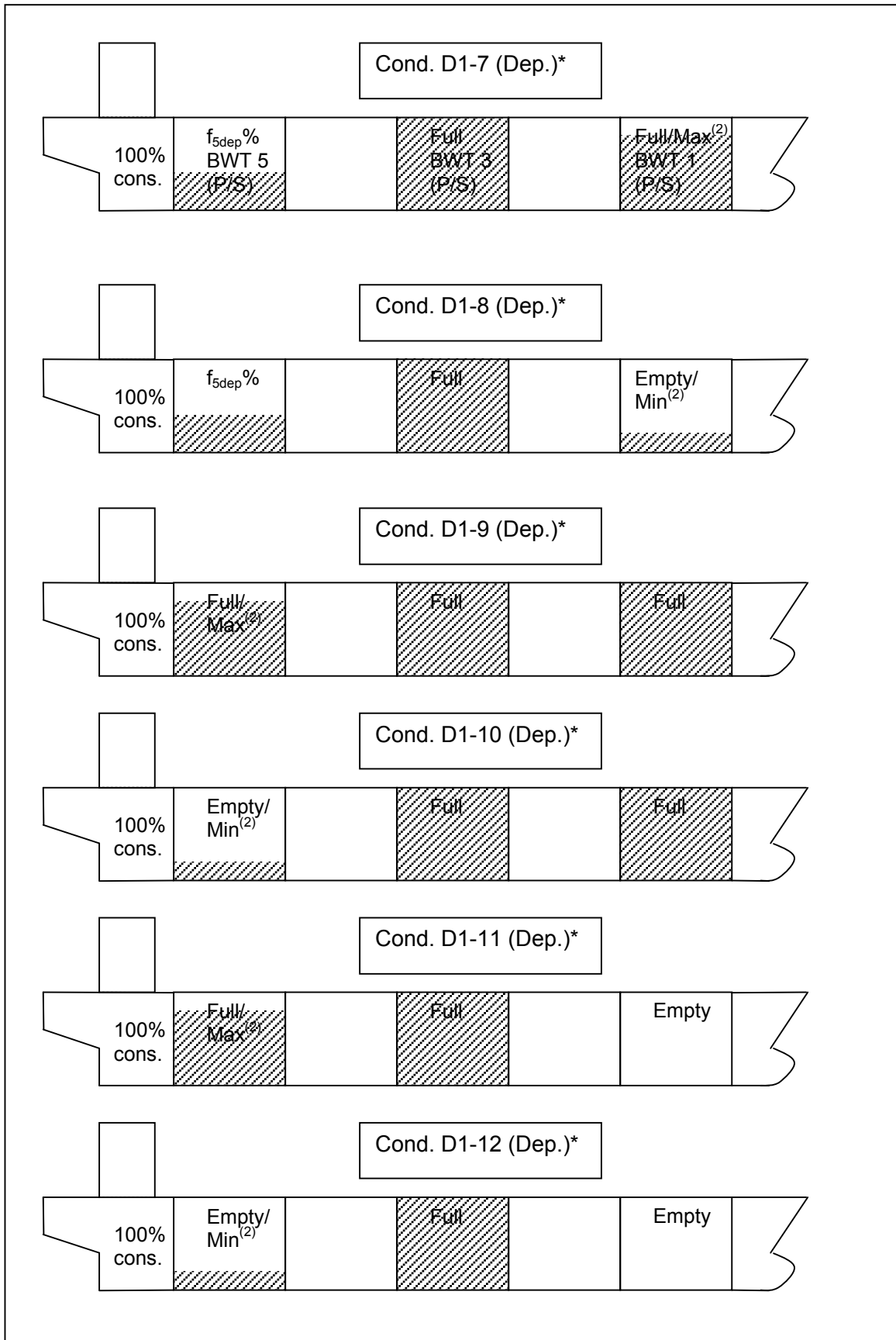


Figure 4(c) Case D, Ore Carrier. Partial filling of BW Tank no.1 (P/S) and 5 (P/S) during voyage. Departure conditions D1-7~D1-12, only intended for strength verification (not operational) are marked: *

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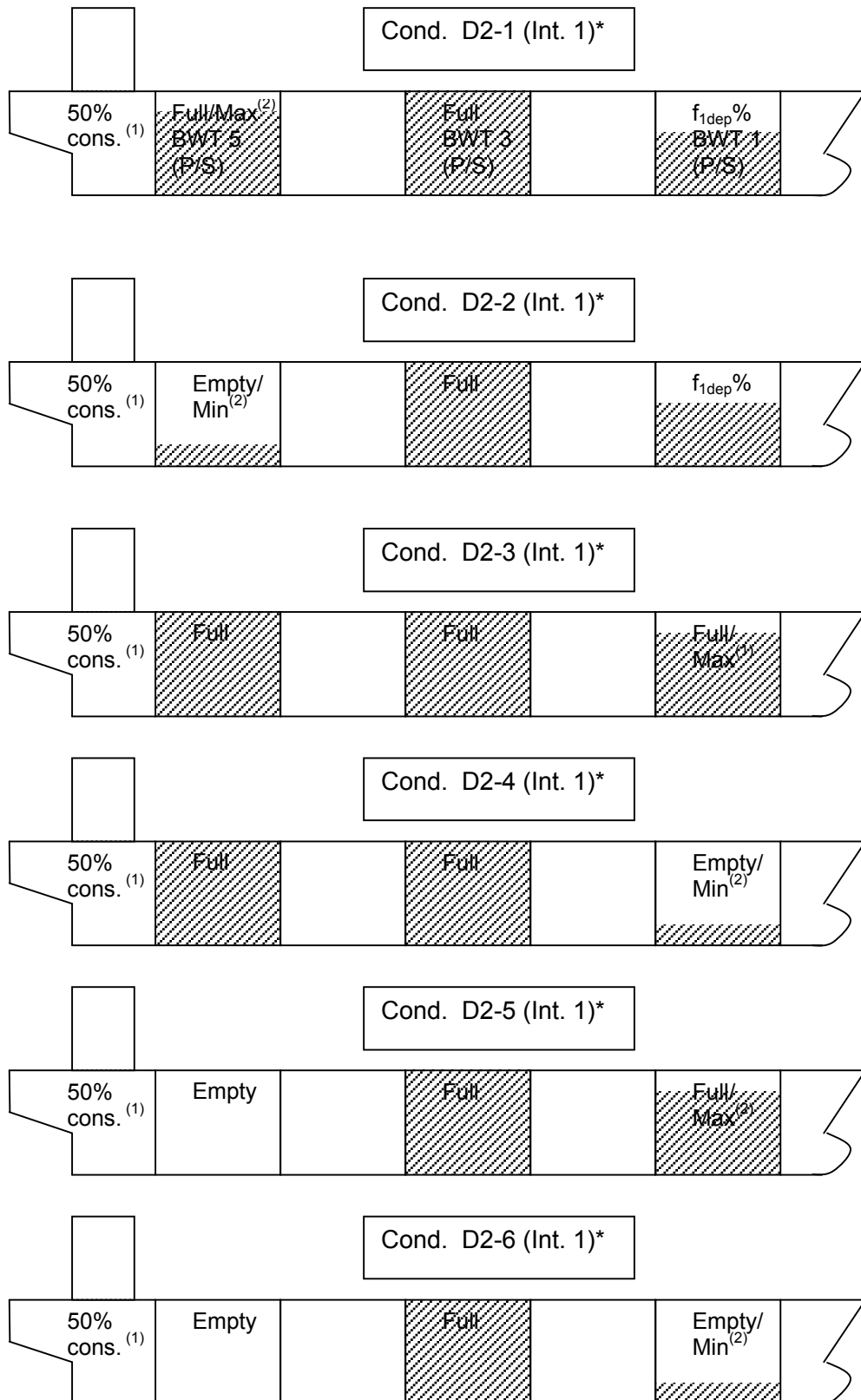
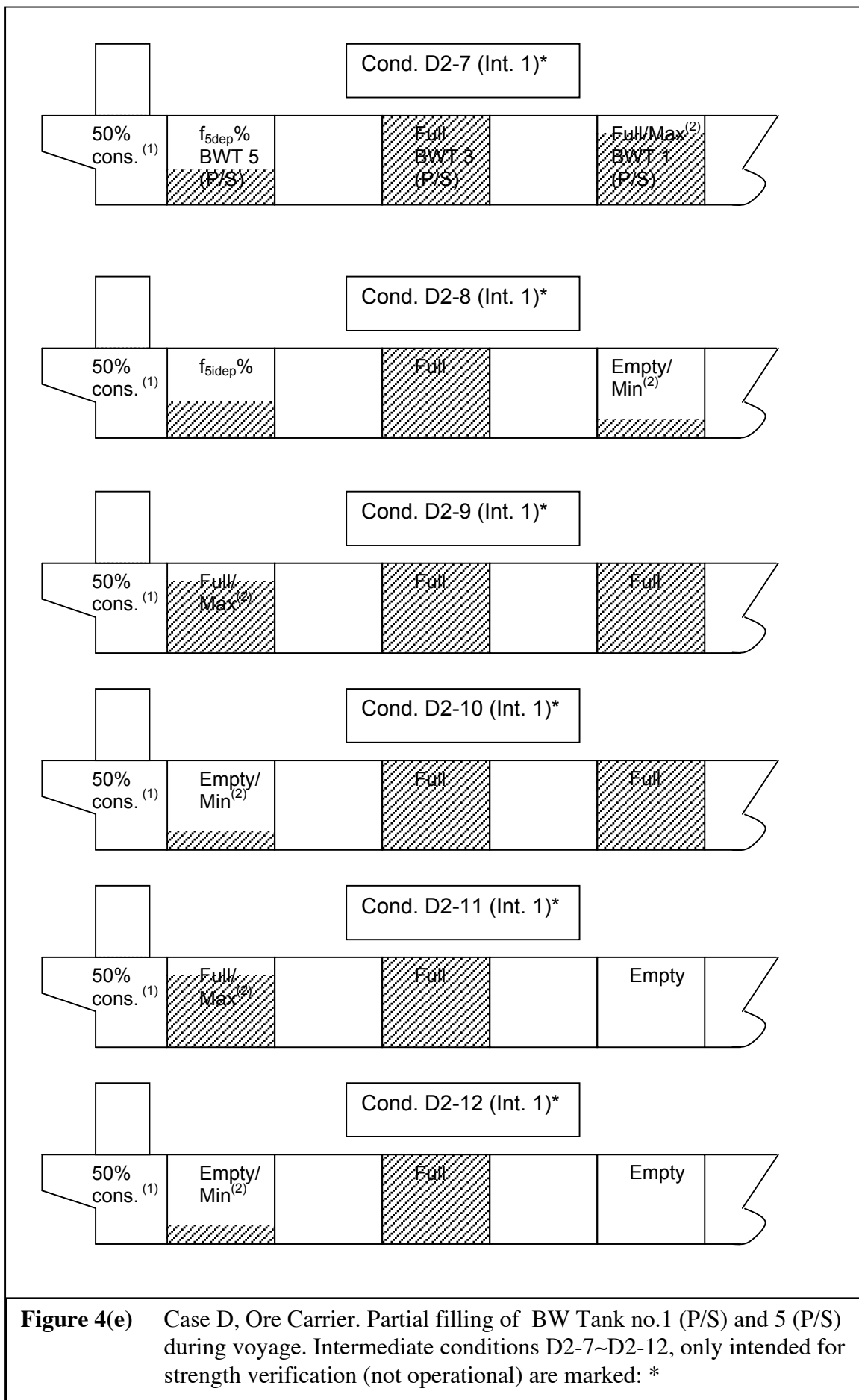


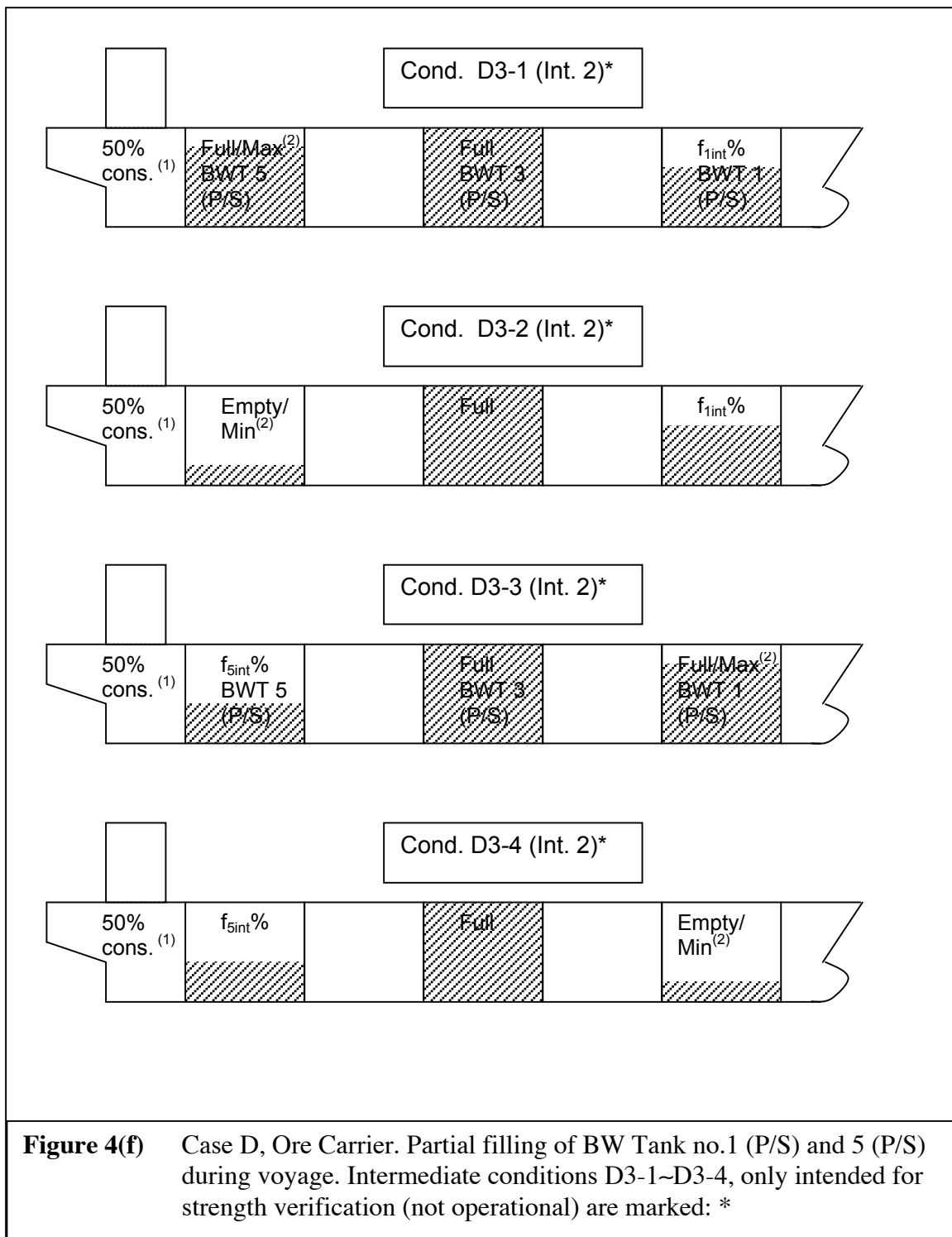
Figure 4(d) Case D, Ore Carrier. Partial filling of BW Tank no.1 (P/S) and 5 (P/S) during voyage. Intermediate conditions D2-1~D2-6, only intended for strength verification (not operational) are marked: *

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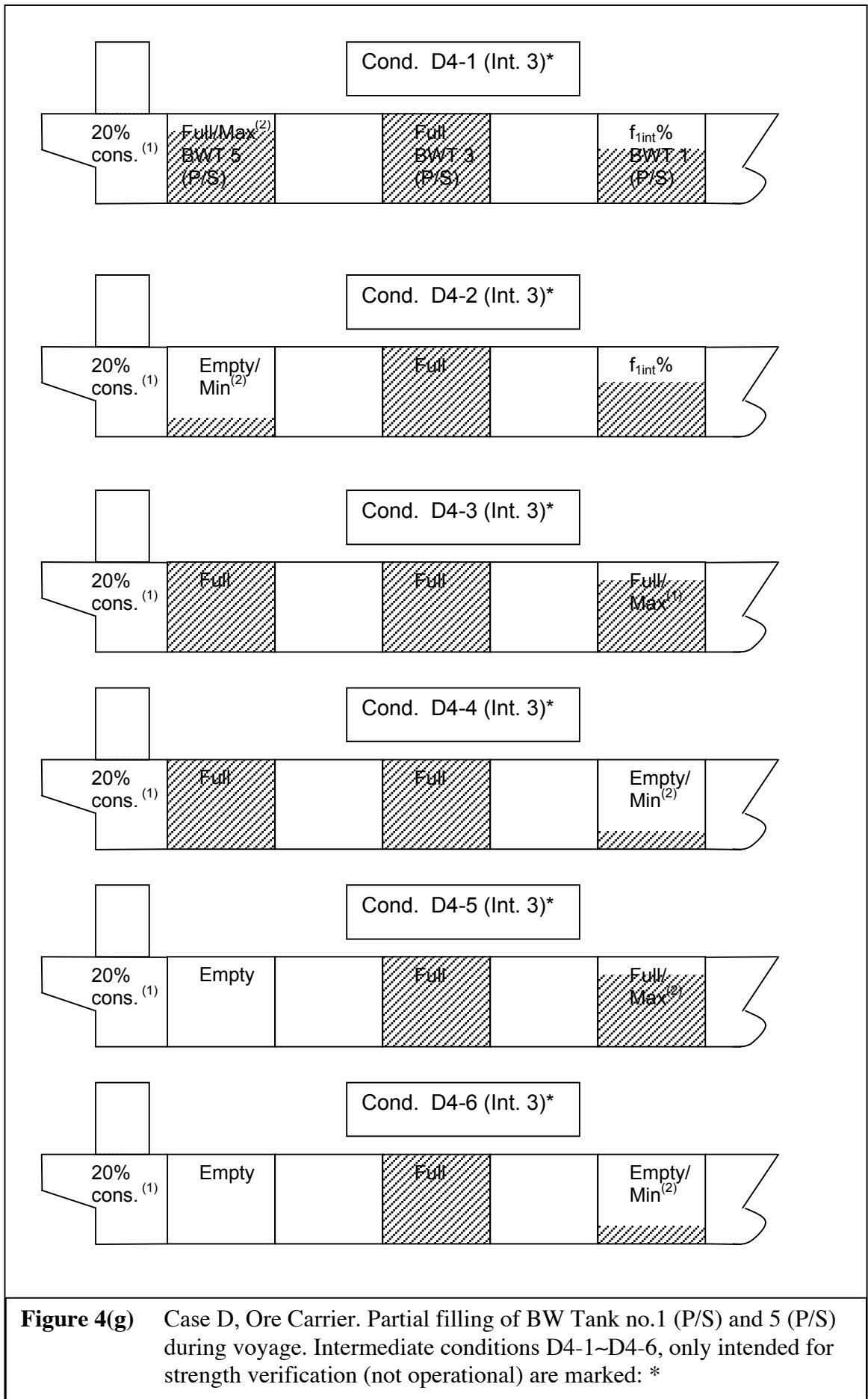


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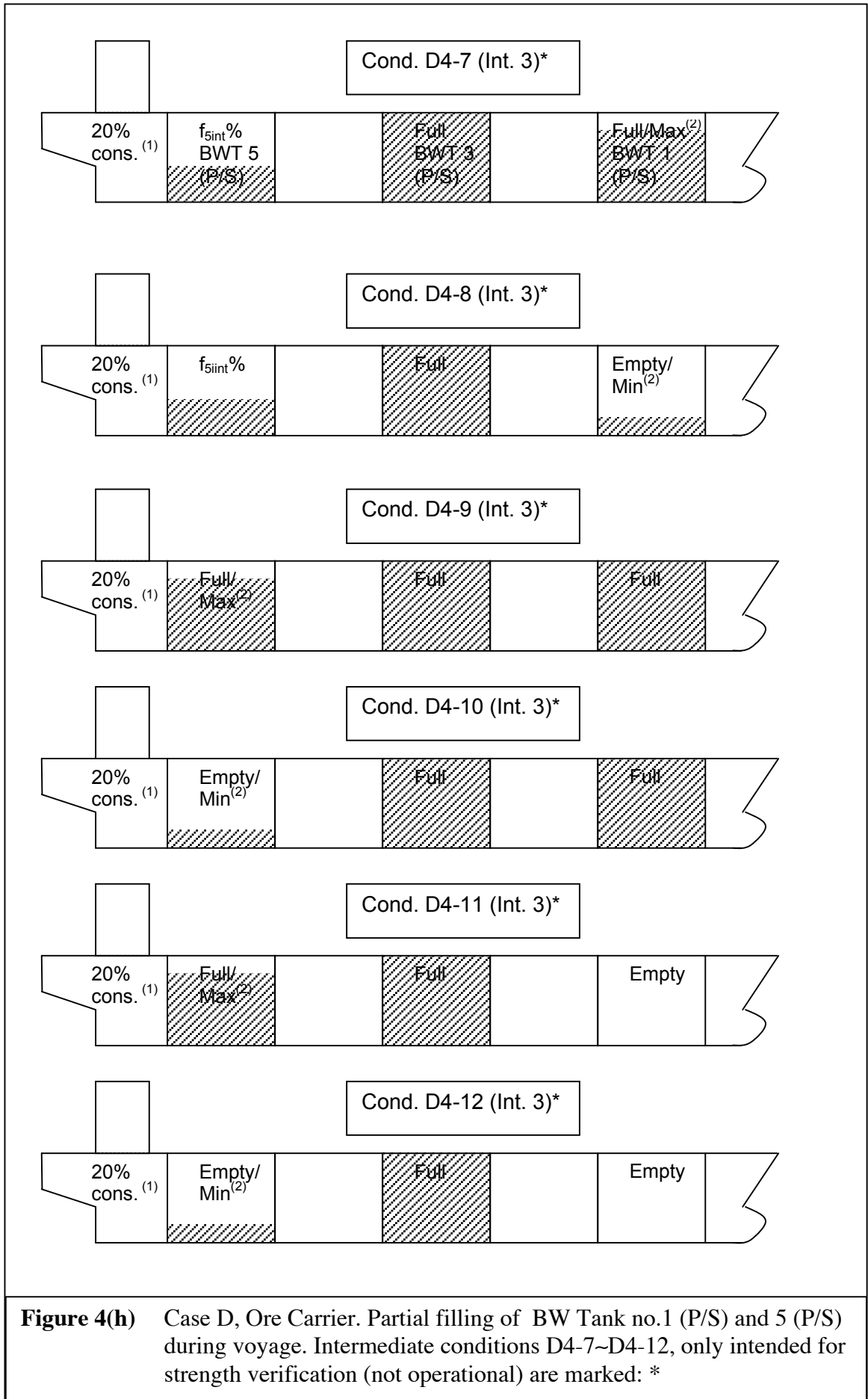
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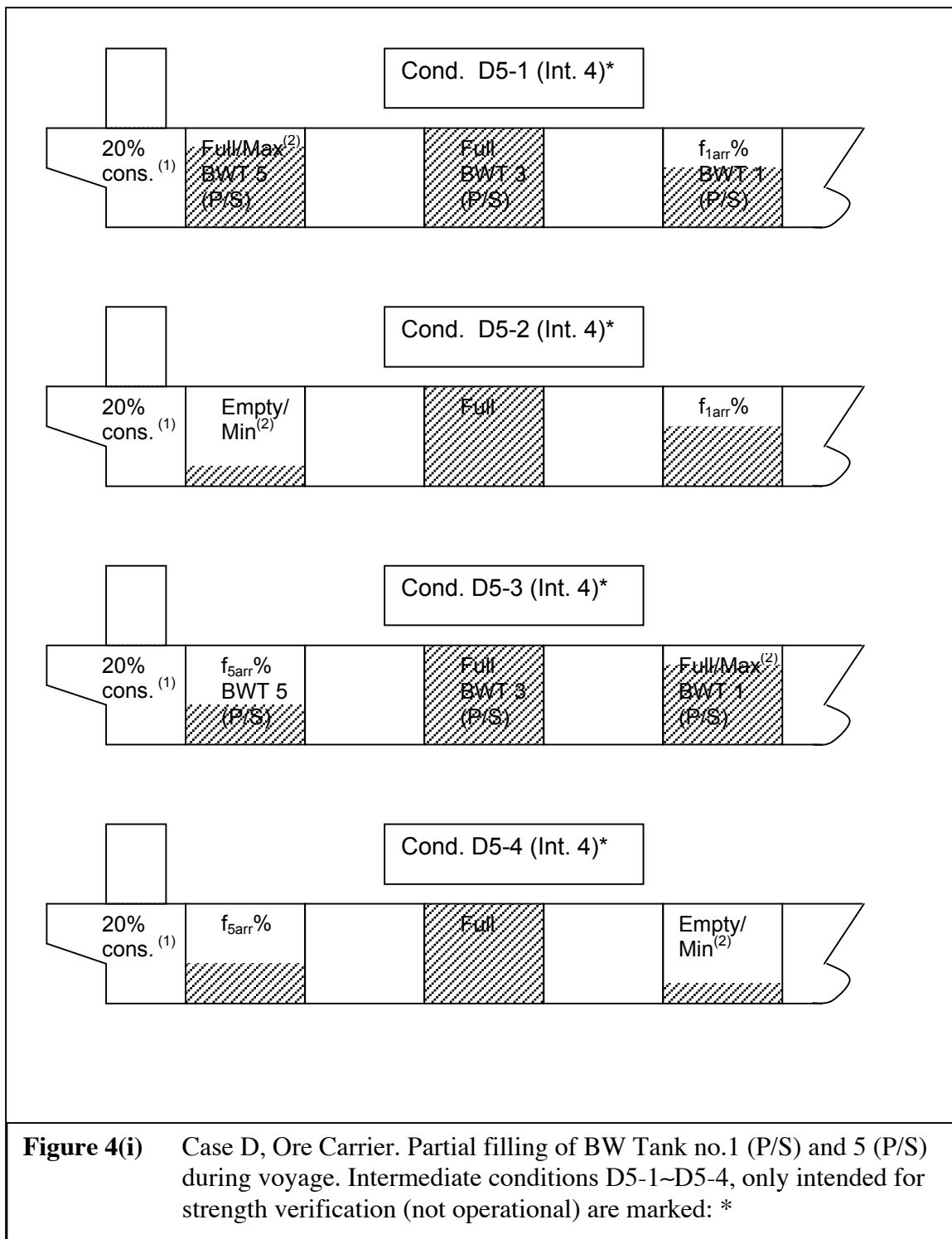


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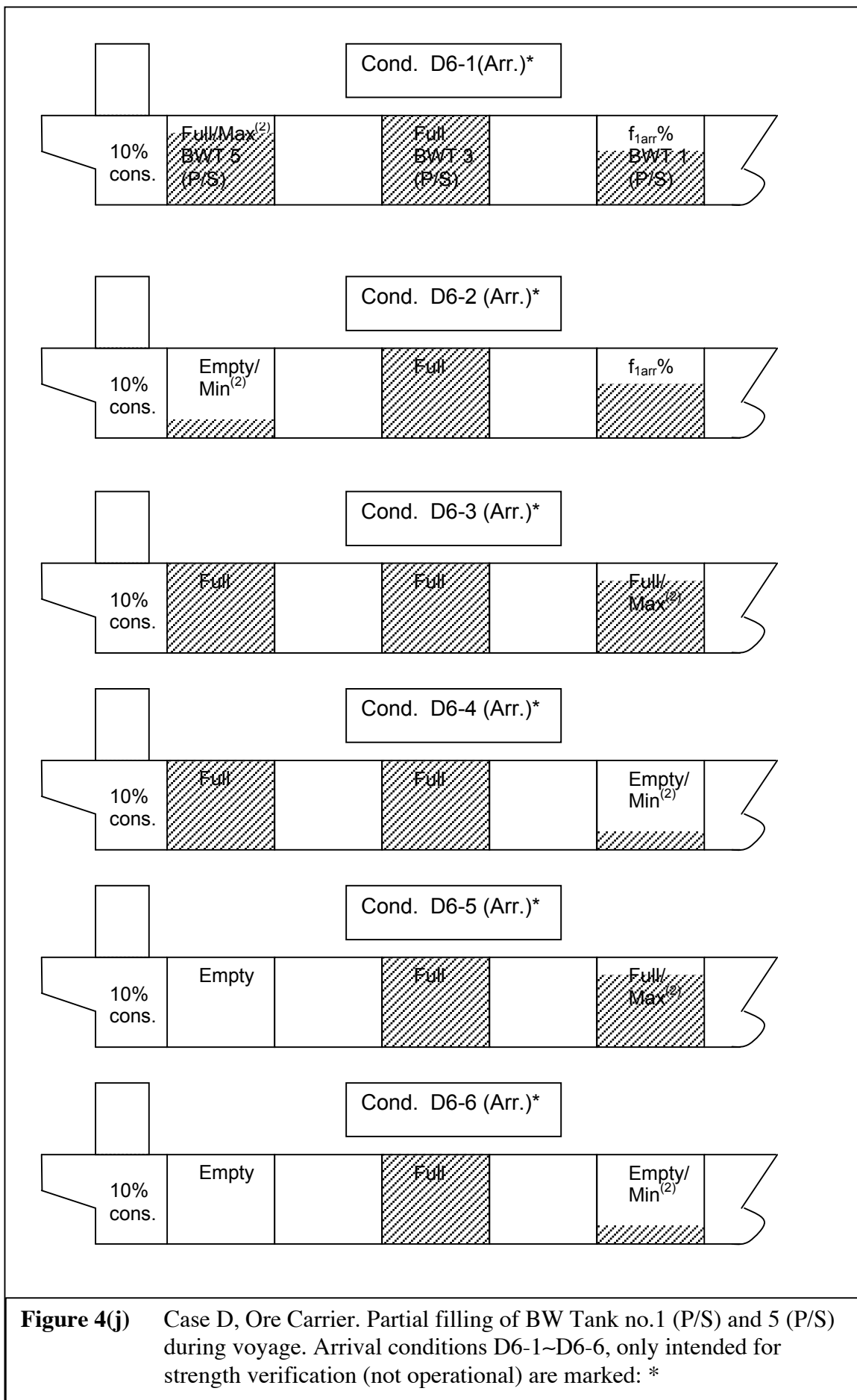


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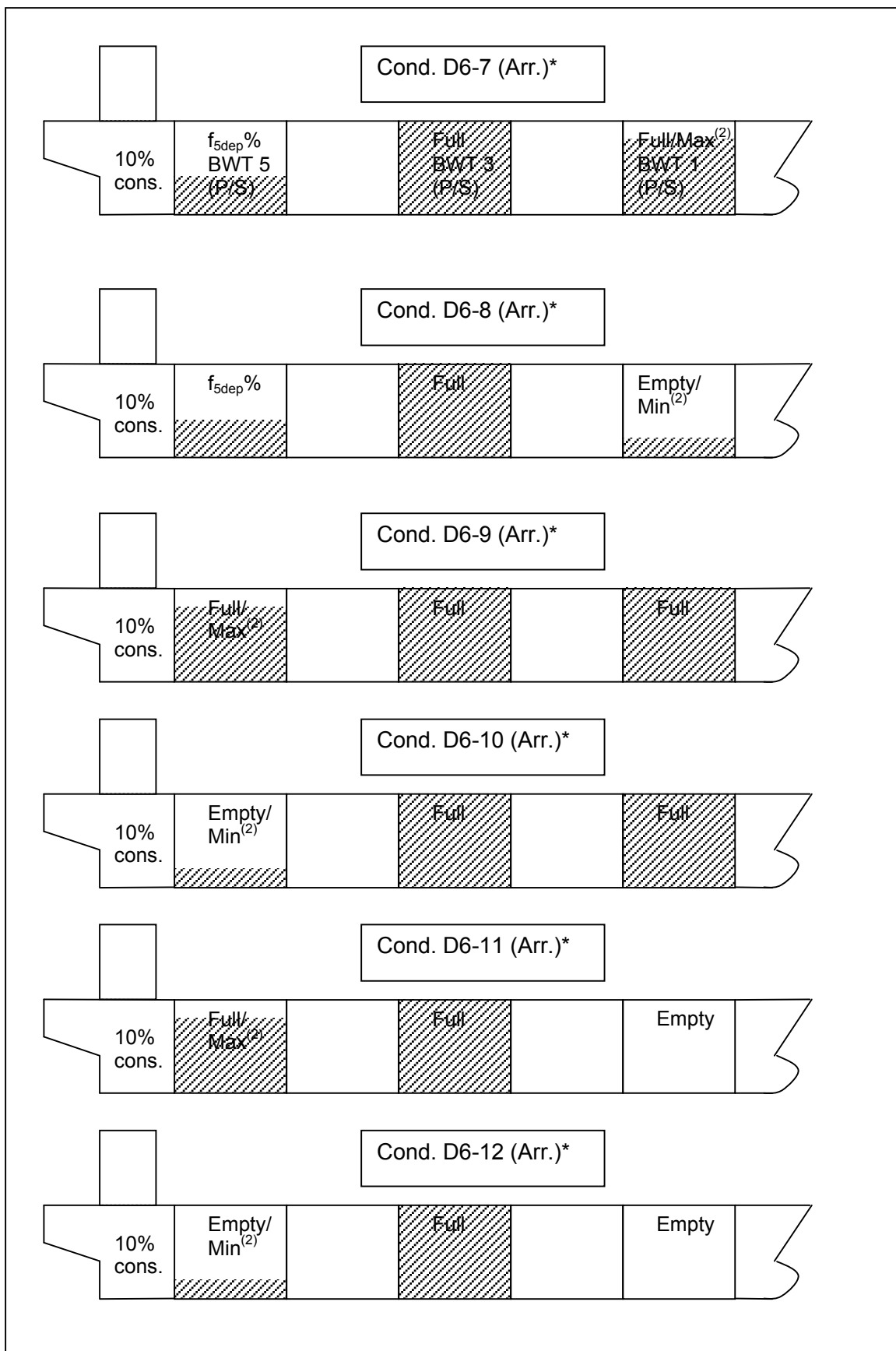


Figure 4(k) Case D, Ore Carrier. Partial filling of BW Tank no.1 (P/S) and 5 (P/S) during voyage. Arrival conditions D6-7~D6-12, only intended for strength verification (not operational) are marked: *

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