INTERNATIONAL MARITIME ORGANIZATION

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MARINE ENVIRONMENT PROTECTION COMMITTEE
61st session
Agenda item 18

MEPC 61/18/4
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FORMAL SAFETY ASSESSMENT

Updated function of oil spill cost versus spill weight (C/W formula)

Submitted by Japan

SUMMARY

Executive summary:	This document provides an updated oil spill cost function developed by using combined databases of the IOPCF, Norway and the United States
Strategic direction:	12.1
High-level action:	12.1.1
Planned output:	12.1.1.1
Action to be taken:	Paragraph 10
Related documents:	MEPC 59/17/1, MEPC 60/17/1, MEPC 60/WP.11 and MEPC 60/22

Introduction

1 MEPC 56 noted that the one matter that needed consideration within the context of the Formal Safety Assessment Guidelines relevant to the work of the Committee was the draft Environmental Risk Evaluation Criteria (EREC). The CATS formula is one of the most important EREC, and the Committee has made strenuous efforts to develop the CATS formula. The Working Group established at MEPC 60 discussed functions of oil spill cost versus spill weight (C/W formula), which is a core component of CATS function, but did not reach a conclusion. The Committee urged Member Governments/organizations to verify and adjust as necessary the proposed regression formula (C/W formula) by incorporating additional data (MEPC 60/22, paragraph 17.8.2 and MEPC 60/WP.11, paragraph 21.1).

2 In this document, Japan provides the updated C/W formula based on a combined database of the IOPCF, Norway and the United States.[1]

[1] For detailed information, please contact Dr. Yamada, National Maritime Research Institute: yamada@nmri.go.jp.

Updating the oil spill database

3 Japan proposed a volume-dependent C/W formula at previous sessions of the Committee (MEPC 59/17/1 and MEPC 60/WP.11). The proposed formula was developed based on IOPCF oil spill data only.

4 To derive the C/W formula based on a more comprehensive database, Japan combined the IOPCF, Norwegian and the United States databases. In addition, Japan took into account an inflation rate to adjust the combined database for more accurate comparison (Figure 1). Japan highly appreciates the provision of oil spill databases from Norway and the United States.

Adjusting the C/W formula

5 Figure 2 shows three cost functions derived from regression analyses, which were based on the IOPCF, Norwegian and the United States databases, respectively. The cost function using the United States database is found to be the lowest among three functions. Figure 3 illustrates the cost function using the combined database.

6 Figure 4 shows comparison of five cost functions. Figure 5 presents functions of cost per unit ton. Brief explanation of each cost function is as follows:

.1 Japan (original): function proposed by Japan (MEPC 60/WP.11);

.2 Japan (adjusted): function obtained by adjusting original function by inflation rate;

.3 Greece: function proposed by Greece (MEPC 60/WP.11);

.4 IOPCF+Norway+United States: function derived from the combined databases; and

.5 (IOPCF+Norway+United States) x3.75: function obtained by multiplying function of "IOPCF+Norway+United States" by 3.75 as assurance factor.

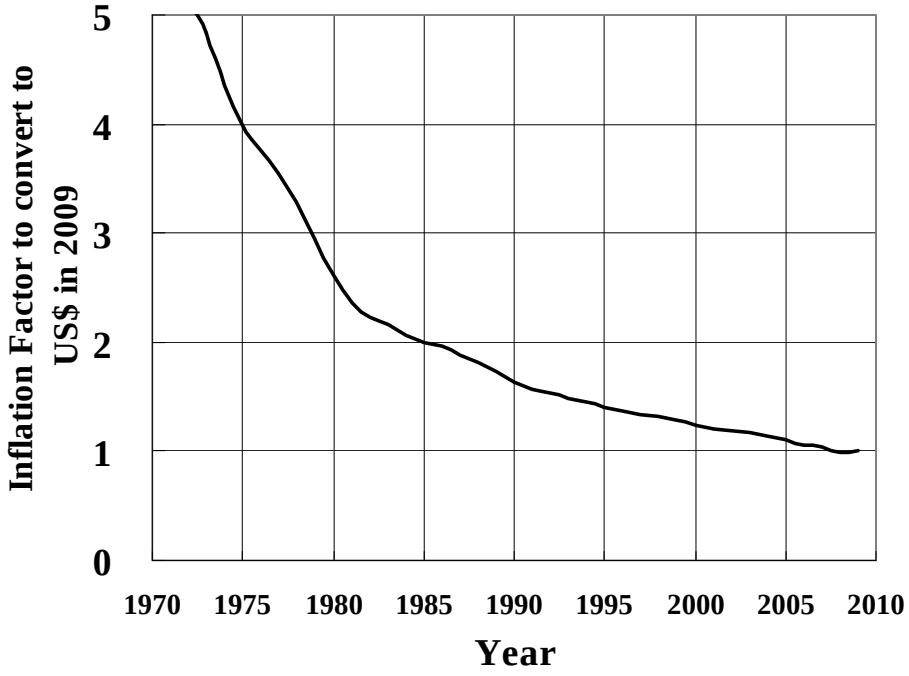

Figure 1: Inflation factor[2]

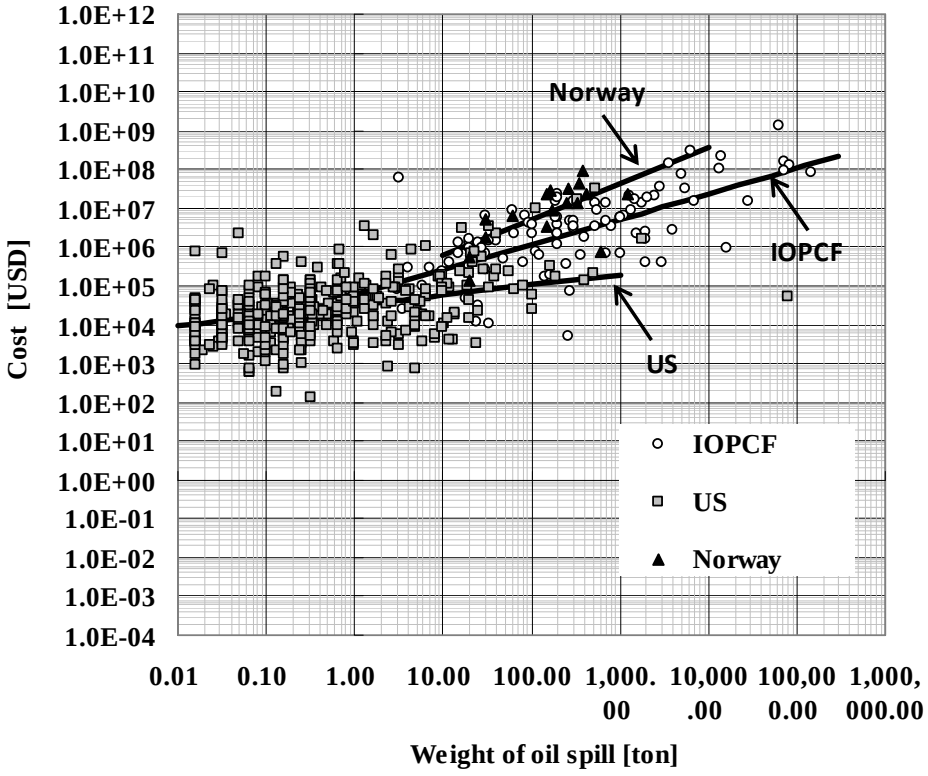

Figure 2: Relation between cost and weight of oil spill

[2] US Inflation Calculator from 1913 to 2010 (http://www.usinflationcalculator.com/inflation).

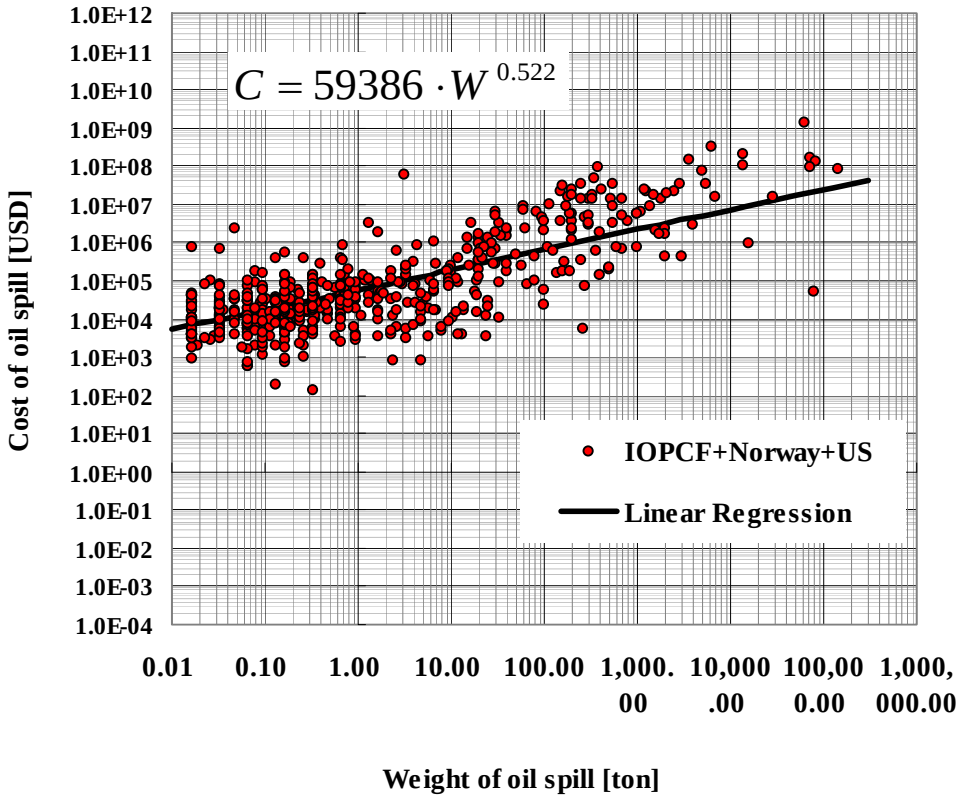

Figure 3: Relation between cost and weight of oil spill

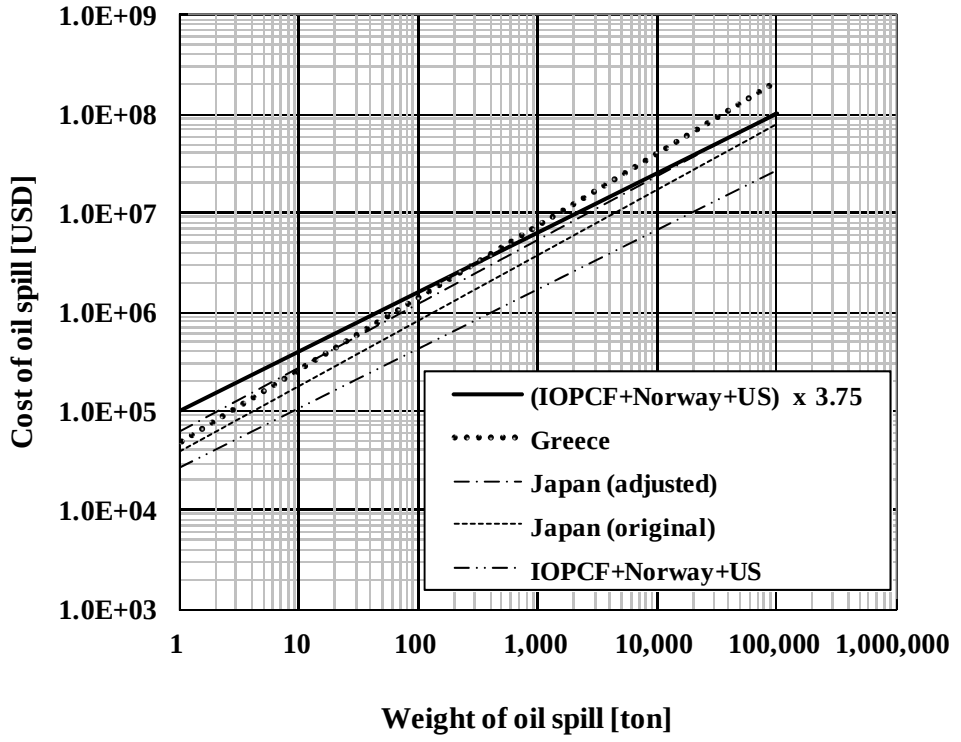

Figure 4: Comparison of different oil spill cost functions

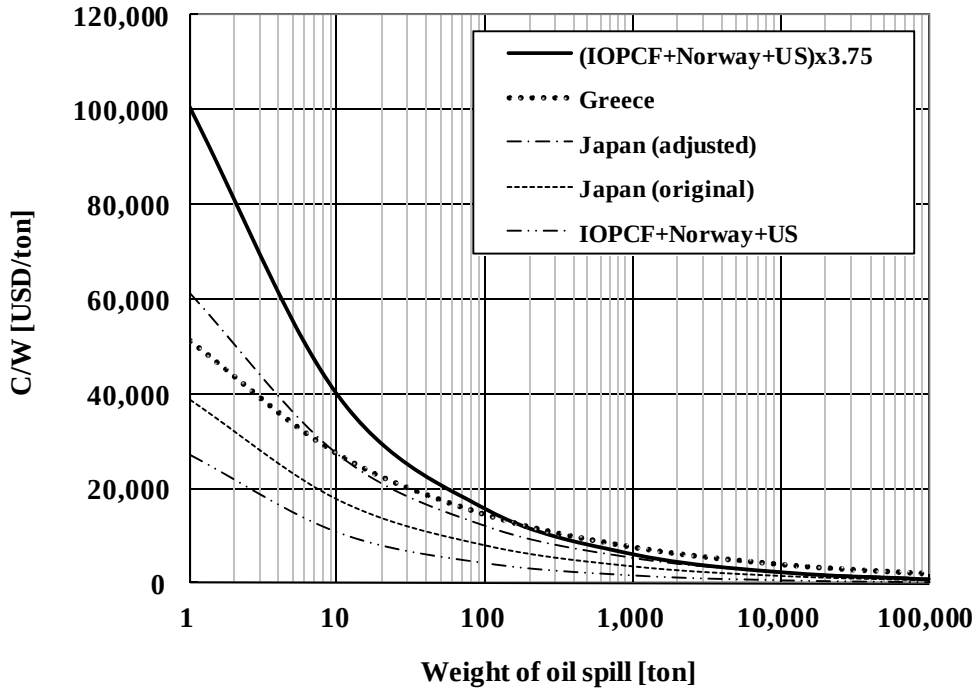

Figure 5: Comparison of cost per unit ton (C/W) functions

Conclusion

7 By combining the IOPCF, Norwegian and the United States databases, the oil spill cost function which is based on a more comprehensive database was obtained. This function can be considered to reflect most of oil spill accidents in the world.

8 As shown in Figure 4 and Figure 5, the C/W formula derived from the combined oil spill database (IOPCF + Norway + United States) is the lowest among all. The main reasons are that a large number of data from the United States were obtained from small oil spill accidents, and that the slope of the cost function based on the United States database is lower than those based on the IOPCF and Norway databases (see Figure 2).

9 In addition to the above points, Japan would like to draw the attention of the Committee to the following: that the value of C/W decreases as oil spill volume increases should not be construed as that large oil spill accidents are less important than small oil spill accidents. It should be emphasized that the cost for prevention of oil spill is represented by C/W x W but not by C/W. As Figure 4 indicates, all cost functions increase as oil spill volume increases. This means that the importance of preventing oil spill accident becomes more significant as oil spill volume is larger.

Action requested of the Committee

10 The Committee is invited to consider information contained in this document and take action as appropriate.