



### 浮冰冲击作用下的乙烯运输船体 舷侧结构强度分析

## Strength Evaluation of LEG Carrier Side Structure Under Floating Ice Impact Load

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**中文关键词：**浮冰 冲击载荷；乙烯运输船；直接强度校核；塑性变形

**英文关键词：**Floating Ice, Impact Load, Ethylene Carrier, Direct Strength Analysis, Plastic Deformation

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**中文摘要:**

该文对限航区的21000m<sup>3</sup>乙烯运输船舷侧结构，分别采用纵骨架式和横骨架式冰区加强设计。根据FSICR规范要求，更新舷侧冰带区域内构件尺寸，并对艏部冰带区域内船体结构建立原始设计、纵骨架式冰带和横骨架式冰带结构设计的有限元模型。通过线性强度计算，确定艏部冰带区新结构设计满足规范设计载荷要求。在此基础上，单独建立首货舱冰区舷侧外板板架的非线性有限元ABAQUS模型，研究2种新设计形式适用的外板在更大的浮冰冲击载荷作用下塑性变形。计算结果表明：纵骨架式结构外板塑性变形明显低于横骨架式冰带结构。

**英文摘要:**

This paper adopts both longitudinal framing and transverse framing ice strengthening design for side structure of ethylene carrier with unrestricted service area. The structure scantling in the broadside ice belt region was redesigned according to requirements of the relevant ice codes. For forward ice belt region, FE model was established based on both original design, new longitudinal framing and transverse framing design. New designs were verified by linear FE method under rule defined load. Non-linear software package ABAQUS was further utilized to analysis the plastic deformation of these two new designs subjected to larger floating ice impact load. Results show that the plastic deformation of longitudinal framing ice belt structure was obviously lower than the transverse framing ice belt structure under floating ice impact force.

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