

equipment development efforts at the same time, how to make these independent research achievements and equipment as soon as applied to South China Sea deep-water development projects in China, need to study to test our existing conditions and policy mechanisms and related procedures and specifications. Therefore, the task of this issue is through extensive domestic and foreign technology research, combining the main foreign manufacturers, research institutions and companies in deepwater drilling, the development of key equipment development, industrialization in the process of applying the development from the indoor unit testing, integration testing to field testing technology and test procedures, the sea test certification system, research to our country existing conditions and policy mechanism test technology and related procedures and specifications.

Key Words : Drilling equipment; Development equipment; Test plan; Sea trials

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## 大洋性金枪鱼围网捕捞与超低温保鲜 关键技术研究

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**摘 要**: 2013年开展了网具作业性能的研究, 对网具进行了海上测试和模型试验, 初步确定了围网网具调整方案; 开展了金枪鱼围网数值模拟研究, 并取得一定的成果; 初步完成了人工集鱼装置和集群效果分析和自由群捕获成功率的研究; 完成了GPS浮标系统方案的制定和原理图设计, 进行了论证性试验与各种数据的采集; 通过海上调查与试验研究, 开发高效生态型金枪鱼延绳钓渔具渔法, 提高目标鱼种产量, 减少非目标物种的误捕, 提高我国金枪鱼延绳钓渔业的捕捞技术, 获得分析报告1份, 初步开发了延绳钓渔具作业状态三维动态显示软件。开展了金枪鱼鱼肉鲜度和色泽研究, 建立了鱼肉色泽评定方法的研究, 确定了蓝鳍金枪鱼赤身、中腹、大腹三个部位肌肉解冻后的肉质最佳观测时间, 探寻了色差仪测量鱼肉色泽的最优测色背景; 开展了冻藏条件下(-18℃)蓝鳍金枪鱼三个部位肌肉脂肪氧化和鱼肉色泽变化的研究, 确定了肉质变化最快的部位, 并通过相关性分析, 探究了各指标间的相关密切程度, 通过研究金枪鱼不同加工工艺参数对产品质量的影响及配套设备的研制、筛选, 形成了金枪鱼超低温冷冻加工技术。目前, 已发表(已标注)论文15篇(其中EI和SCI收录3篇), 已接受待发表论文4篇, 投稿论文6篇; 申请发明专利3项; 获软件著作权1项。较好地完成了2013年度工作计划和考核指标。

**关键词**: 金枪鱼 围网捕捞 保鲜 关键技术

### Research on Key Technology of Tuna Purse Seine Fishing and Ultra Low Temperature Preservation

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**Abstract**: The project has been carried out successfully in 2013. Project group developed a series of studies in relation to operational properties of purse seine, primarily involving in-situ measurement, model experiment and numerical simulation. The research results provided some pertinent suggestions for the modification of present purse seine gear. Preliminary, we established the adjustment plan and acquired a certain achievement. Furthermore, analysis of the effect on gathering fish school by FADs and the rate of fishing success for free school have been accomplished with survey report submitted in the final summary. Based on the survey and experiment at sea, the

high efficiency and eco-friendly pelagic longline will be developed to enhance the catch of targeting species and to reduce the by catch of non-targeting species. Finally, the longling technique of China will be improved. The project has been carried out successfully in 2013. The assessment method of tuna meat color was researched and the best observation time for three bluefin parts (the cephalic parts of the dorsal and ventral ordinary muscles, the caudal part of the ventral ordinary muscle) after thawing was confirmed, so did the perfect background for the chromatic meter. The change rule of fat oxidation and meat color for three parts storing at the same freezing temperature ( $-18^{\circ}\text{C}$ ) was carried out and the part which changed most fast was confirmed, and through correlation analysis, the levels of intimacy of each index was studied. Through the research on the effect of diverse tuna processing technology parameters on the quality of the product and developing the corollary equipments, the tuna super-freezing process was established. At present, a total of 15 papers are published (labeled by this research), which include 3 paper published in the journal of EI and SCI. There are 10 submitted papers (including 4 received papers). We also applied for 3 invention patents. Based on the description, we think we successfully completed the annual working plan and evaluation indicators in 2013.

Key Words : Tuna ; Purse seine; Preservation; Key technology

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## 深海地震仪浮力材料成型工艺研究

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**摘要 :** 该实验采用自主研发的真空密炼挤出成型机对深海地震仪浮力材料成型工艺及加工条件进行探索, 探讨空心玻璃微珠、环氧预混料在不同成型方式下对成型产品的气孔率、压缩强度、耐静水压强度的影响。研究表明, 使用真空密炼挤出成型方式(真空度为  $0.04 \pm 0.01$  MPa)成型时性能最佳, 固化后的标准块气孔率  $2/\text{dm}^2$ , 密度为  $0.55 \pm 0.02$  g/cm<sup>3</sup>, 压缩强度为 62 MPa, 24 h 极限耐静水压强度为 72.5 MPa, 60 MPa 一周吸水率小于 2%, 可在水下 6 000 m 安全使用。

**关键词 :** 固体浮力材料 成型工艺 空心玻璃微珠

## Research the Molding Process of Deep Sea Seismograph Buoyancy Materials

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**Abstract :** The molding process and processing conditions of deep sea seismograph buoyancy materials were investigated via self-developed vacuum extrusion molding internal mixer. The effects of hollow glass beads and epoxy premix under different forming methods on the porosity, compression strength and resistance to hydrostatic strength of molding products were studied. The performance of molding product was the best when using the vacuum internal mix extrusion molding under the vacuum degree of  $0.04 \pm 0.01$  MPa. Standard piece of porosity after curing was less than  $2/\text{dm}^2$ , density was  $0.55 \pm 0.02$  g/cm<sup>3</sup>, the compression strength was 62 MPa, 24h hydrostatic strength limit was 72.5 MPa, the week water absorption of solid buoyancy material under 60 MPa was less than 2% and can be used safety in underwater 6 000 m.

**Key Words :** Solid Buoyancy Material (SBM); Forming Process; Hollow Glass Bead (GB)

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