National Development Plan 2007 - 2013

Cleaner Greener Production Programme

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

At a Glance

JFC has successfully designed and manufactured the JFC 400 litre mussel float for long line rope mussel culture for national and international markets.

The plastic float is rotationally moulded at the facility in Tuam. The JFC 400 litre mussel float is designed so that it can support two horizontal rope lines, thus maximising the crop that can be grown in various conditions. JFC has designed the float which can withstand the pressures of high waves and which will sit steadily in the water even when loaded with a full crop of mussels. The introduction of the revolutionary new sub-aqua float system is increasing mussel crop yields by as much as 30%.

As part of the project, JFC has developed a closed loop take-back of end-of-life mussel floats to be recycled and replaced with the new superior JFC mussel floats. The closed-loop return of old floats for the supply of new superior floats enabled Irish fishermen dispose of 28 tonnes of plastic in an environmentally sustainable manner last year. The product will have an increased lifespan compared to competitors and is 100% recyclable.

A closed loop take-back of end-of-life mussel floats

CGPP3 2005/1

Sustainable Design, Manufacture, Use & Recycling of Plastic Mussel Floats

JFC Manufacturing Co. Ltd
Weir Road, Tuam, Co. Galway, Ireland.

JFC Manufacturing Ltd

JFC Manufacturing Ltd. (JFC) was established in Tuam in 1987 and has expanded to its present international status with plants in Poland, The Netherlands, and several subsidiaries in the UK. JFC is a global organisation renowned worldwide for its innovative quality plastic products in the agriculture, marine and materials-handling, environmental and civil industries and employs over 200 staff. JFC manufactures a range of environmental products including bottle-banks, underground bottle-banks, waste-oil storage units and waste segregation products. Investment in people, R&D, leading-edge technology, and a commitment to quality and customers ensure that JFC maintains its position as a market leader in the plastics industry. Approved to ISO 9001-2000 standards, JFC designs all products in-house, fabricates moulds and manufactures products with the most advanced machinery available in the rotational moulding industry today. This CGPP project relates to the sustainable design, manufacture, use and recycling of plastic mussel floats used by the mussel fishing industry in Ireland and abroad.

Aim of this Project

Traditionally, the mussel farming industry used plastic barrels as floats when growing mussels that often proved very costly as in stormy conditions the floats, with a crop attached, often sink or break up and a complete crop can be lost. This CGPP project aimed to design, manufacture, and retail the most environmentally sustainable and superior performing plastic mussel floats in the market. The following were the specific aims and objectives of the project:

- To ensure used mussel floats are correctly disposed and recycled into other products through a closed-loop return system (old floats to be returned to JFC and new floats are distributed)
- To design and develop a mussel float to meet the changing needs of the market (outperforming competitor products in harsh sea conditions)
- To measure and compare the new design with comparable products to ensure it has superior performance and longevity
- To optimise the weight of raw material being used while maximising performance of the float based on the original prototype weight
- To minimise the manufacturing cycle time and energy used in the manufacture and compare to prototype runs
- To deliver eco-design training to staff in JFC
- To generate improvements in mussel crop yield by using the new and better designed floats.

Old Mussel Floats for Recycling

Project Description

The project concept arose in 2005 and was identified as an ideal project to apply the principles of CGPP in design and manufacture. JFC contracted the services of Shane Mooney of SPeco Services Ltd. as Project Manager for this initiative. The project has largely run according to the original and projected time scales with all the deliverables and objectives being achieved. JFC used external stakeholder participation in the process which was very useful i.e. fishermen fed into the design process and tested the prototypes being developed. Over the project's 18 month duration, JFC has successfully designed and manufactured the JFC 400 litre mussel float for long line rope mussel culture for national and international markets.

The plastic float is rotationally moulded at the facility in Tuam. The JFC 400 litre mussel float is designed so that it can support two horizontal rope lines, thus maximising the crop that can be grown in various conditions. The mussel float is oval-shaped so that it can provide optimum floatation in the water. JFC has designed the float which can withstand the pressures of high waves and which will sit steadily in the water; even when loaded with a full crop of mussels. The introduction of the revolutionary new sub-aqua float system is increasing mussel crop yields by as much as 30%.

As part of the project, JFC has developed a closed loop take-back of end-of-life mussel floats to be recycled and replaced with the new superior JFC mussel floats. The product will have an increased lifespan compared to competitors and is 100% recyclable.

Newly redesigned and recycled floats

Achievements

A primary objective of this CGPP project was to prevent plastic mussel float barrels being land filled or being dumped illegally when they were no longer being used. The closed-loop return of old floats for the supply of new superior floats enabled Irish fishermen dispose of 28 tonnes of plastic in an environmentally sustainable manner last year. The plastic, should it have been unnecessarily land-filled, would have occupied in excess of 73 cubic meters of space in the landfill. As a result of the recycling, the recyclate substituted out virgin materials that would have been used in the manufacture of bases for bottle banks etc. thus significantly reducing the environmental impact of the product. The embodied energy of recycled plastic is approximately 50% that of virgin materials.

Other key benefits occurred from the CGPP project include:

- The provision of eco-design training and CGPP principles training for JFC staff
- The establishment of a closed loop take-back, recycling and re-supply of mussel floats
- The supply of superior mussel floats increasing yield by 30% and which are more robust to withstand storms at sea
- New JFC floats have a reduced visual impact in the water
- JFC has hosted school visits to increase the awareness of local young people of the importance of eco-design, and recycling of plastic in particular.

Lessons

The CGPP project brought focus to the area of environmental design and recycling of plastic materials from the fishing industry. The experience to date has been very positive with JFC reporting increasing revenue from sales of the new mussel float product. The reduction in raw material use for the modified float design has positive impacts in terms of cost of raw materials as well as reducing environmental impact. The use of an external consultant as Project Manager facilitated the successful implementation of this project. In addition, JFC mussel floats have the potential to help countries not traditionally associated with mussel-culture to develop a thriving new sector. Recently, JFC sold several hundred mussel floats to Bulgaria and it is anticipated that countries such as Croatia, Norway and the Falkland Islands, have the potential to become significant mussel producers in the future.

Observations

This CGPP project was generated from an idea and product that was core to the business development strategy of JFC. The business needs are met when a project with environmental benefits is complementary to the business strategy. In this case, the two were mutually compatible and, when a challenge arose there was an appetite to overcome it for both environmental and business gain. The company learned that it is important to plan adequate resources to manage the administration of the project, which is as important as the product development element itself. JFC presented at an Enterprise Ireland environmental forum and collaborated in testing training software that proved to bring more to JFC than had been expected or envisaged. Collaboration and communication with other companies within the CGPP programme, or more generally on environmental agendas, proved worthwhile during this project.

Additional Information

For more information on this project contact:

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Cleaner Greener Production Programme

The Cleaner Greener Production Programme (CGPP) of the EPA was funded under the National Development Plan 2000 – 2006. The CGPP was launched in 2001 as a grant scheme to Irish organisations to implement cleaner greener practices while achieving significant cost savings.

Cleaner Greener Production is the application of integrated preventive environmental strategies to processes, products and services to increase overall efficiency and reduce risks to humans and the environment.

- Production processes: conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes.
- Products: reducing negative impacts along the life cycle of a product, from raw materials extraction to its ultimate disposal.
- Services: incorporating environmental concerns into designing and delivering services.

The programme aims are focussed on avoiding and preventing adverse environmental impact rather than treating or cleaning up afterwards. This approach brings better economic and environmental efficiency.

Under Phase 3 of CGPP, a number of organisations were funded from a variety of sectors (e.g. chemicals, food, metals, electronics, service etc.). Major achievements such as reductions in environmental impacts, energy savings, economic savings, increased competitiveness and patent applications resulted from Phase 3.

The programme will continue to be funded by the EPA in the NDP 2007-2013.

This case study report is one of the reports available from the companies that participated in the third phase of the Cleaner Greener Production Programme. A summary of all the projects and CD containing all the reports are also available.

More information on the programme is available from the EPA:

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www.epa.ie/researchandeducation/research/

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