Update

Ostfalia University of applied science

Output II – recycling and analysing of fishernet materials and fishing gear

Outline

- Analytics
  - Nets
  - Floats
- Recycling process of a fishing net
  - Shredding
  - Pelletizing
- Next Steps

Analytics

Plastic Type

- Vietnam: 9 nets & 1 float
  - 4 x PE
  - 1 x PA
  - 3 x PE/PP (+additives)
- Germany: 7 nets & 7 floats
  - 5 x PE
  - 2 x PA
  - 7 floats: PS

- 2-3 materials have not yet been clearly identified
  - Probably similar material
  - shows characteristics of PE & PP
  - Samples from Siam Brothers will be used for further tests and a recycling process in Germany

Nets

- Some samples are very clean (few contaminations, pure material)
- In some cases, the samples and/or additives have not yet been clearly identified.
- First results show good basis for recycling
- Next steps:
  - Testing the determination of age (checking quality)
  - More recycling tests
  - Investigation of washing water, surface (microscopy)
  - Further samples has been collected from Rach Gia an will be analysed

Floater

- Polystyrol (PS)
- The inner material shows a clear difference to the outer material.

Outside:	Inside:
» Faded colour » Dents and scratches » Contamination » Degradation (UV-rays, Water, aging, storaging)	» Bright colour » No dents, scratches or contaminations – no contact to the environment » better performance in analytical tests than the outside

- The manufacturing process requires the outer layer to have a different structure to the inner layer.
- Further tests are planned: microscopy, recycling, etc..

Recycling of a fishing net

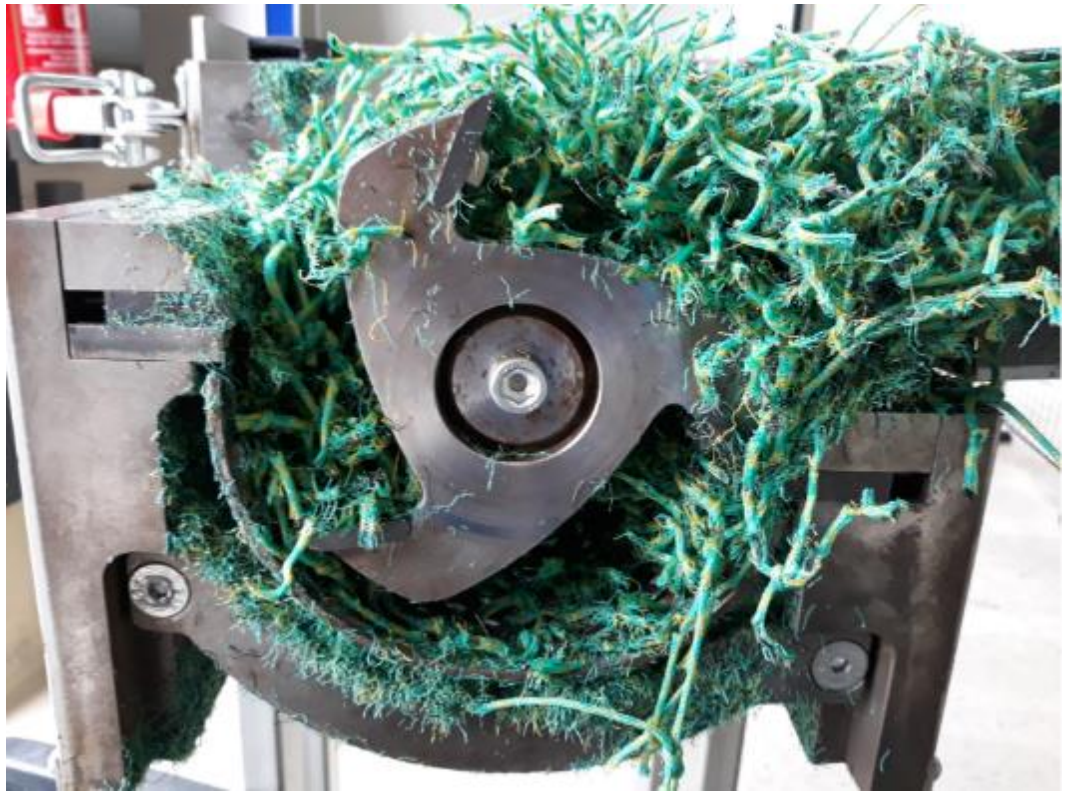
Recycling of a fishing net

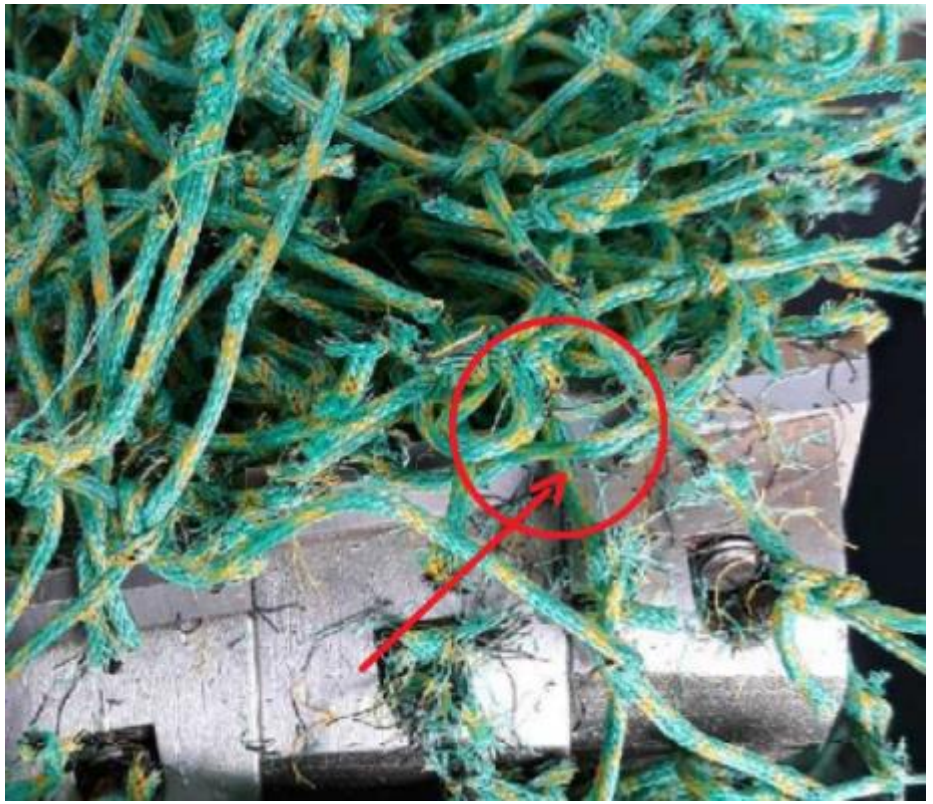
- approx. **180 m²** and **53 kg** of original material
- **17,40 kg** has been recyceled
- Plastic type: **polyethylene (PE)**
- **Different colours** are included (green, yellow, black)

Shredding the net

- The rotor picks up the net and pulls it in at the speed of rotation until the machine stops.
- The main problem was the blocking of the rotor blades by entangled nets.
- Increased power input and constant peak loads (fibres are ripped, not cut)
- Cutting the large net in pieces by hand reduced the dosage and allowed a better control of the feed.

Shredding the net





Shredding the net

- By the end of the test period, the cutting/throughput rate had dropped significantly. The blades are dull.
- It is thought that the abrasive action of the shell chalk and/or sand contained in the nets is responsible for the abrasion of the cutting tools.
- Bridging is caused not only by static charging but also by fibre entanglement. The low flowability can cause problems in further processing.

Results

- The need for a technical device to prevent the uncontrolled removal of the load (Roller Feeds)
- Increased attention to the choice of equipment is necessary to avoid consequential damage.
- Bulk desity: 147,6 g/dm^3 ~ 0,148 kg/dm^3
- Measurement of the electrical power input to correlate it with the grinding mass produced.

Pelletizing

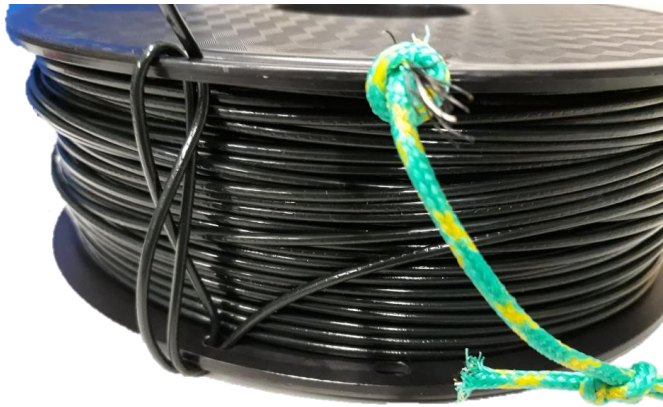
- Grinded material contained large fibre-pieces (not shredded).
- Due to the bridging of the fibres, the material was hardly able to flow.
- The dosage of the fibres into the extruder had to be done by hand.
- Extrudate showed good processability
  - A visually pleasing surface
  - almost no strand breaks as it passes through the cooling section and the pelletizer.

Results

- Problems with the shredding process
  - Dosage of the material
  - blockage and abrasion of the rotor blades
- Difficulties due to fibre bridging in the shredder and extruder infeed
- Very good processing of the melted material /extrudate

Next Steps

- Testing of mechanical properties
- Detailed comparison between raw material and recycled material
- 3D-printing will be tested



Next steps

- Cutting mill
- Cleaning possibilities
- Separation options
- Recycling of PA and PP nets, PS floats, sample from Siam Brothers
- Testing the determination of age
- 3D-printing will be tested with recycled materials
- Injection moulding with recycled material

Thank you for your attention!

Any questions?