



wieland

Innovative brass material for the use in marine high energy aquaculture

深远海渔业中的创新铜合金材料应用



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The logo for Wieland, featuring the word "wieland" in a bold, lowercase, red sans-serif font.

Head of Aquaculture
Extruded & Drawn Products
Wieland Group
Germany



CEO
BlueSea® Technology
Joint Venture Wieland Group and Lerow AS
Germany - Norway

The Challenges 面临的挑战

1. Who feeds the world? Or:
why aquaculture is a chance.
谁解决了世界饥饿问题
或者：为什么渔业养殖是机会

2. What technology is needed for
safe and environmentally friendly
fish farming?
什么样的科技可以帮助构建安全和生态友好的渔业养殖环境？

3. What does it take to go
offshore with aquaculture?
深远海的渔业养殖是什么样？

4. Why do we know special brass
mesh is a solution - already
successfully implemented?
为什么我们知道已经被成功应用的高性能铜合金网衣是解决方案？

Nearly 200 years of experience in copper and copper alloys 近200年的铜材和铜合金经验

The Wieland Group 维兰德集团

The Wieland Group is globally leading in premium copper alloys and innovative customer solutions.
维兰德集团在优质铜合金生产和创新方案提供上 引领全球。

For the production of strip, sheets, bars, rods, wire, tubes and sections, mainly recycling materials supplemented by new metals are used in the company-owned foundries.

对于铜带，铜板，铜棒，铜线，铜管和型材的生产，铜材料可被回收并用于我司自己的铸造厂。



A global player 全球性企业

The Wieland Group 维兰德集团

Present on all continents 维兰德集团的组成

Manufacturing companies | slitting centers | trading companies.

生产工厂 | 分条中心 | 各国分公司

7,000 employees worldwide

全球7,000员工

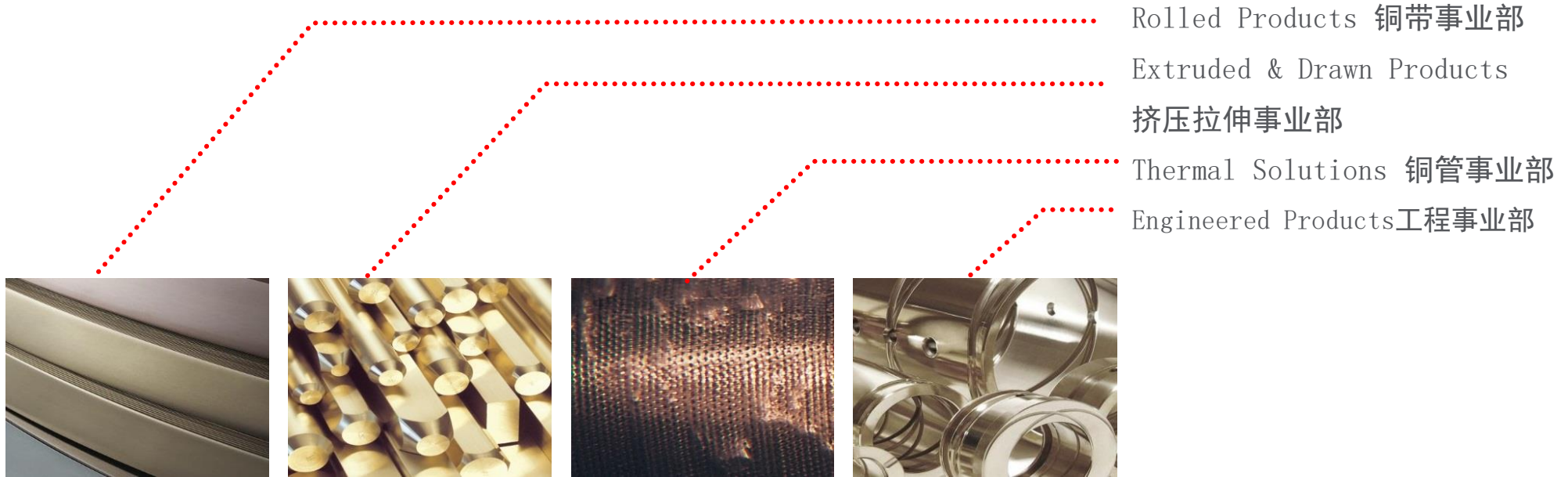
○ Manufacturing companies
● Further companies

Four divisions with customer solutions for megatrends from connectivity, mobility, to global warming and nutrition

The Wieland Group

3.0 Billion EUR Turnover* 245亿人民币的销售总额

500,000 metric tons sales volume 50万吨销售数量



Now,

Why would a producer of semi-finished metal products make a difference in the global nutrition challenge?

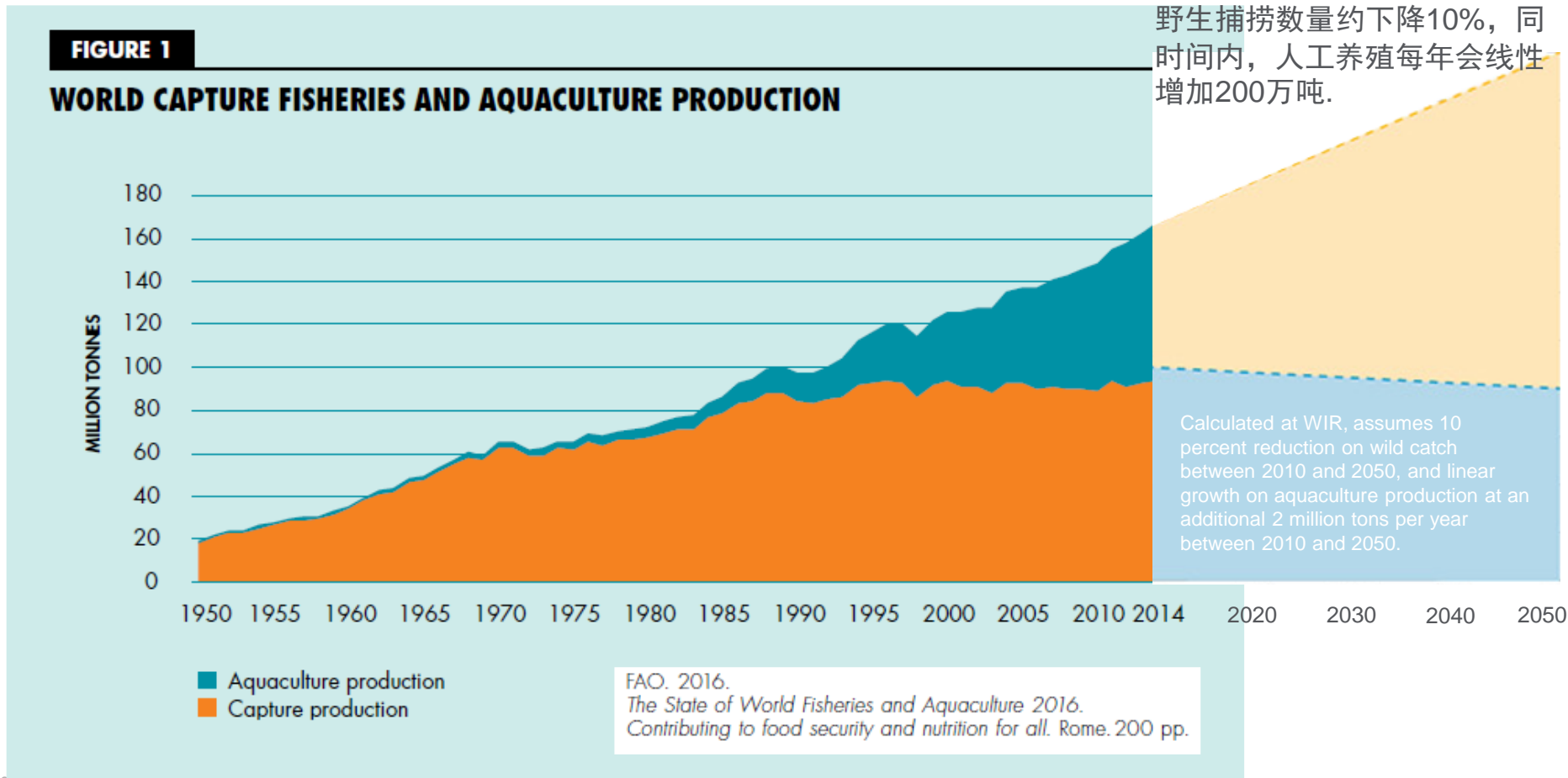
如今，

为什么一个铜材半加工生产商
会帮助解决全球饥饿问题呢？

While wild capture fisheries are a depleting resource, aquaculture is continuously increasing. 当捕捞野生鱼类资源短缺时，渔业养殖持续增长。

1 | What will 9.8 billion people eat by 2050? 到2050年，98亿人口吃什么呢？

据WIR计算，2010年至2050年，野生捕捞数量约下降10%，同时间内，人工养殖每年会线性增加200万吨。



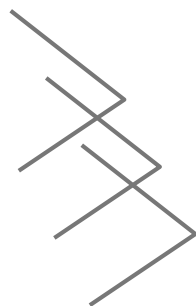
Which technology is needed for sustainable and efficient fish farming? 什么科技可以实现可持续性高效的渔业养殖?

2 | Aquaculture is highly resource efficient 渔业养殖 十分高效



Aquaculture meshes need to resist seawater and have to be
渔业养殖的网衣必须抵抗海水侵袭和保证以下:

- Safe 安全防止鱼类逃脱
- valid for offshore 适合深远海使用
- environmentally friendly 环境友好

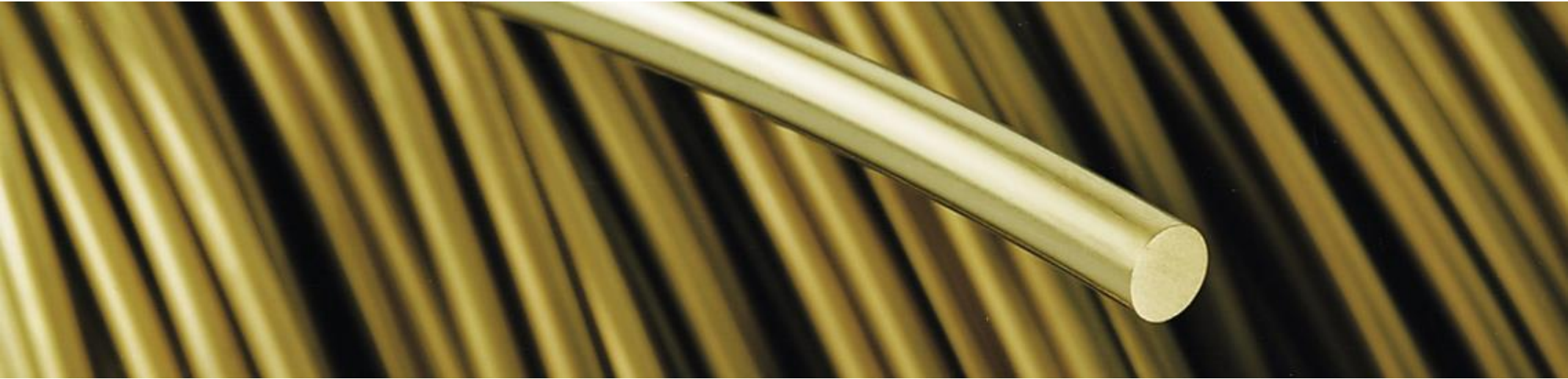


Wieland has developed special aquaculture brass for these requirements

维兰德已研发出可以满足这些需求的特殊高性能铜合金材料应用于该行业

Wieland SE1 is a special brass wire for marine applications 维兰德SE1是适用于海洋渔业养殖的特殊黄铜线

2 | Special Alloy for Aquaculture 渔业养殖中的特殊铜合金



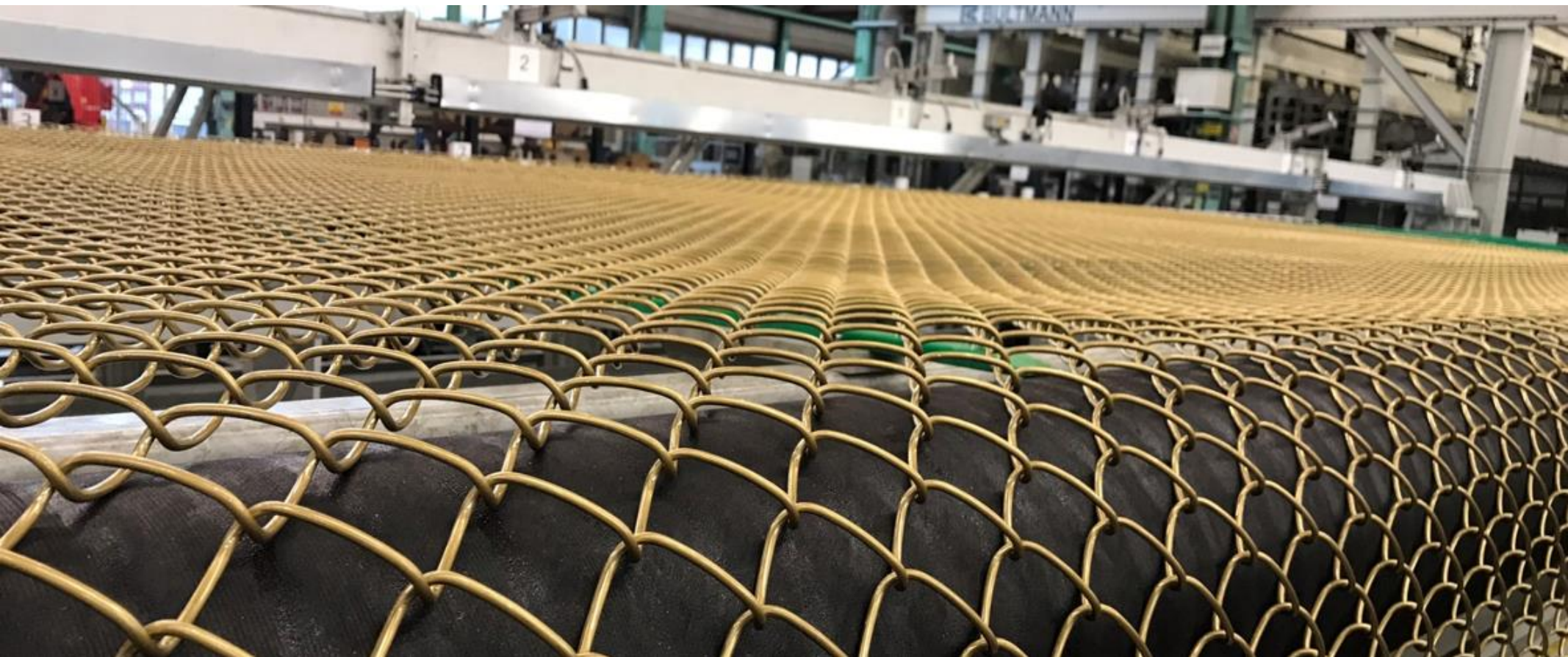
Wieland SE1 BlueSea® Wire

CuZn35Sn1FeP

- excellent corrosion resistance for the use in brackish and seawater 在咸水和海水中有杰出的耐腐蚀性
- excellent wear and good fatigue resistance due to mechanical strength, appropriate to marine aquaculture applications 该机械强度有杰出的耐磨损和抗疲劳性，完美适用于海洋渔业养殖
- inhibits bio-fouling environmentally friendly and naturally 抑制生物污染，对环境和自然友好
- 100% recyclable 100%可回收使用

New aquaculture weaving line – start of production in October 2017 全新的渔业养殖编制生产线-2017年10月开始生产

2 | How can we assure service? By offering the complete product! 如何更好使用？我们提供完整的解决方案



From prematerial to mesh – all in one hand 从胚料到成品网衣 – 一站式服务

2 | How can we assure quality? By controlling the entire process 如何保证品质？控制所有的流程



Partnering in a Joint Venture with Norwegian Industry leader Lerow AS 与挪威行业巨头Lerow AS合资合作

2 | How could be best respond to the Aquaculture market's needs? 如何更好地满足渔业养殖的市场需求



BLUESEA® Technology AS: Facility of JV partner Lerow AS at Hitra, Norway

BLUESEA® Technology AS: 与Lerow AS 在挪威 特拉岛的合资公司

2 | Learnings in a partnership 经验分享

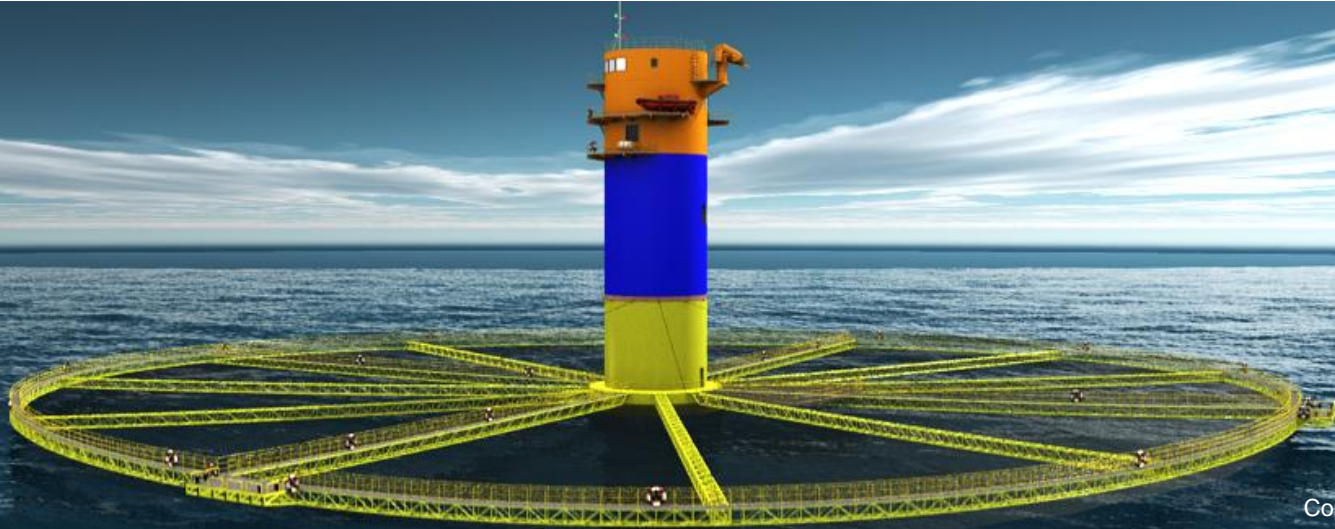
Increase the efficiency by lean processes
精益流程更加高效

Create benefit for the environment
为环境创造效益

- 1. How to reduce steps in process chain – instead of adding some more...**
如何减少相关流程呢？-而不是去增加一些...
 - Take out the net cleaning step in using brass material – remove cleaning instead of making cleaning more efficient 用铜的材料可以免去网的清洗步骤 – 直接去掉清洁的步骤而不是想办法更有效率的去清洗
- 2. How to make it simple- make it standard 如何更简单呢？ 标准化**
 - Standardize mesh size and shape of cages– best practice over the Aquaculture industry to be implemented by the big material suppliers
标准的网目大小和网箱形状 – 大的材料供应商可以提供给海洋渔业相关借鉴
- 3. How to reduce the workload per process step 如何在每个流程中减少工作量？**
 - Instead of changing netting after every production cycle use brass net material that can be used for several cycles 改变经常需要换网的习惯，铜网可以使用多轮养殖
- 4. How to reduce the carbon footprint 如何减少碳排放量？**
 - Use sustainable resources and materials – brass material can be recycled by 100% and thereby keep the value of the metal part 使用可持续的资源 and 材料- 铜网衣可以100%被回收，且黄铜可以保值

Key criterion to do offshore fish farming

3 | What does it take to go offshore?



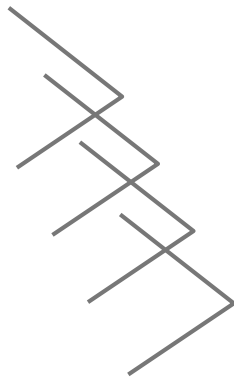
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Maintenance 维护

Capacity 承重

Longevity 使用寿命

Environment 环境



Less fouling → minimum maintenance necessary

更少的附着 → 减少维护

Robustness of brass mesh → enables high load

铜网衣的稳定性 → 可以承重更多

Special brass alloy → long life characteristics

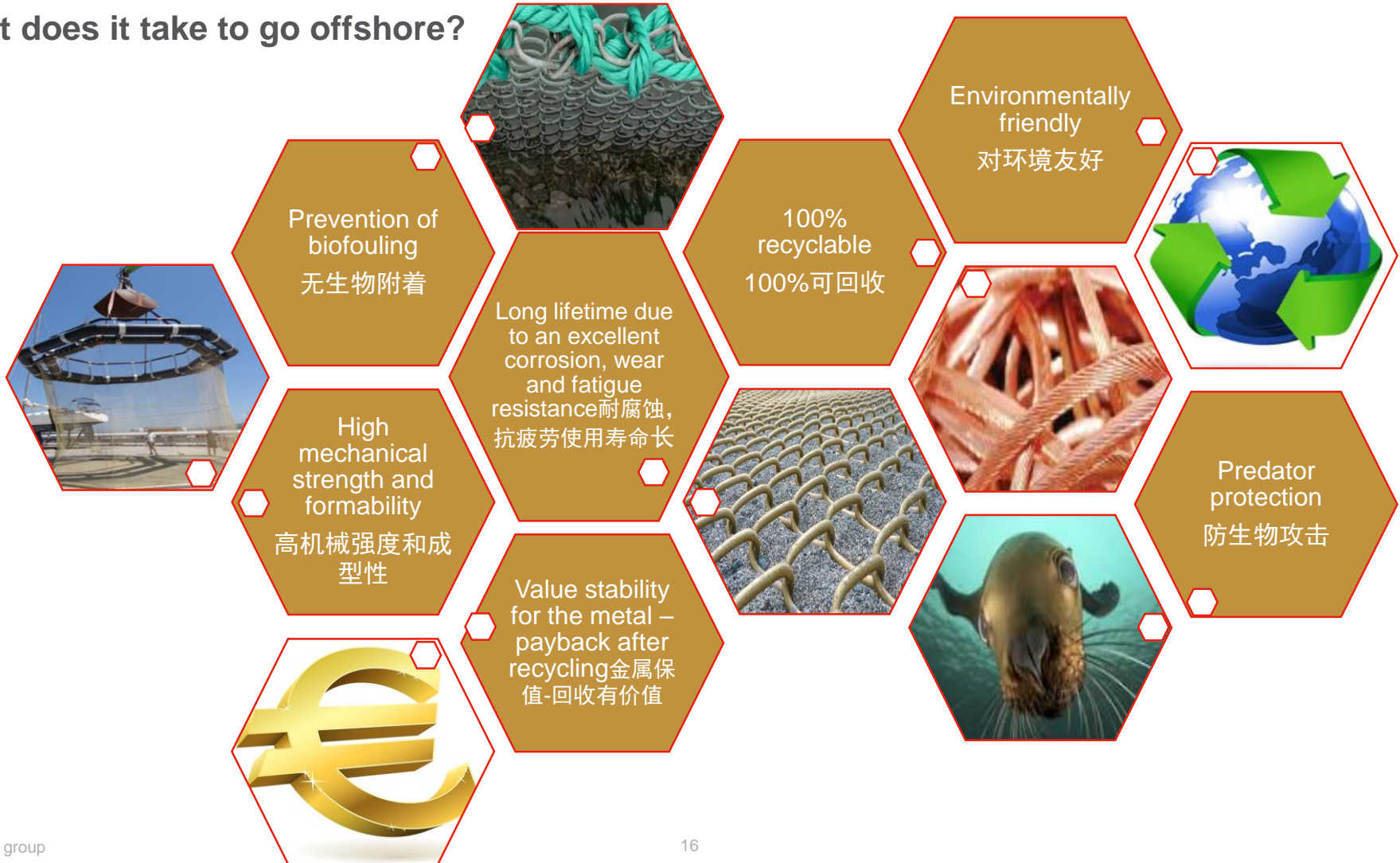
特殊的铜合金材料 → 更长的生命周期

Special brass alloy → no metal or chemical

emissions, 100% recyclable

特殊的铜合金材料 → 没有金属和化学物的排放, 100%可回收

3 | What does it take to go offshore?



4 | Special aquaculture brass mesh – a proven solutions 高性能铜合金网衣- 被验证多次的解决方案



Successful project completion

June 2017 – After 25 months in North Sea the cage was taken on land.

2017年6月-25个月后再挪威北海网箱被拿出来

- ✓ only 2 light cleaning operations during 25 months
25个月只有两次轻微清洗操作
- ✓ excellent performance of brass material 铜网衣杰出的水下表现
- ✓ **Lack of any detectable copper in the sediment surrounding of the cage**
- ✓ 铜网周围检测不到任何铜材沉积物
- ✓ **ASC Standard certification**
ASC认证



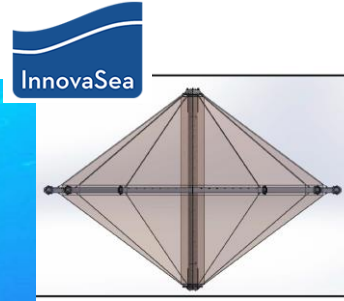
Project Start May 2015

Cage	Ø 35.6 m
Cage depth	28 m
Wire Ø	2.75 – 3.00 mm
Mesh size	20 mm

4 | Special aquaculture brass mesh

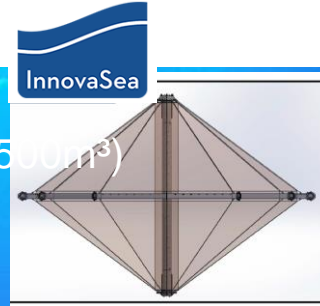
InnovaSea Project – Offshore fish farming – Panama

- 6.400 m³ (8.000m³, 14.500m³)
- Effective pen height: 24 m
- Diameter 35 m
- Weight of complete System: 31 mT
- About 10 tons of Wieland BlueSea® Mesh
- Tons of about 100 mT Fish/ year
- Pen designed and assembled in 2016
- Start of fish production: early 2017
- Place of construction: Panama
- Customers final location: Panama



InnovaSea Project – 深海渔场 – 巴拿马

- 养殖水体：6.400 m³ (8.000m³, 14.500m³)
- 主体高：24 m
- 平台直径长35 米
- 项目总重量：31 吨
- 用量约10吨维兰德BlueSea® 铜合金网衣
- 养殖产量：100吨每年
- 设计和安装于2016年
- 开始使用：early 2017
- 使用地：巴拿马
- 客户所在地：巴拿马



4 | Special aquaculture brass mesh 渔业养殖中的特殊铜合金网衣 应用

DeMaas Project – Offshore fish farming – China

- 185.000m³
- Effective pen height: 12m
- Diameter 140m
- Weight of complete System: >7.000 mT
- About 100 mT of Wieland BlueSea® Mesh
- 8.000 – 10.000 mT of Fish/ year
- Start of design: Q1 2017
- Start of fish production: Q2 2019



DeMaas Project – 深海渔厂 – 中国

- 养殖水体：185.000m³
- 主体高：12m
- 直径：140m
- 整体项目重量 >7.000 mT
- 使用约100吨维兰德BlueSea® 铜合金网衣
- 养殖产量：8.000 – 10.000 吨每年
- 开始设计：Q1 2017
- 预计使用：Q2 2019

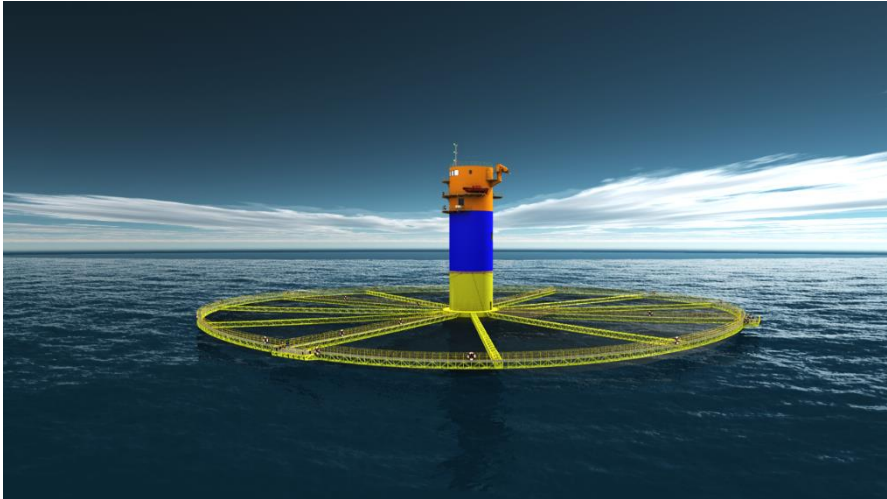


Current projects all over the world prove acceptance and value of the solution

4 | Aquaculture @ Wieland Group 渔业养殖@维兰德集团



Challenge: New technology for offshore fish farming 挑战：深远海渔业养殖 新科技





Thank you!

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