
Presentation to the MRIA

10th February 2012

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CEO, Technology from Ideas**

Introduction to Tfi

- Tfi is a technology development company, delivering innovative technology based services & solutions
- We source, aggregate, invent, develop and commercialise early stage technologies
- We work with businesses and researchers/inventors,
 - helping businesses find and develop innovative technology solutions
 - helping researchers develop & commercialise their inventions
- Team of Scientists & Engineers based in Waterford

Tfi Marine Components

- Novel components for Marine Energy devices that will facilitate a reduction in capital and o&m costs
- Polymer components that
 - Reduce the cost of mooring systems
 - Protect & enhance performance of Wave Energy & other devices
 - We are working with international partners to develop and deploy them
- Engaged in both scale and full scale evaluations



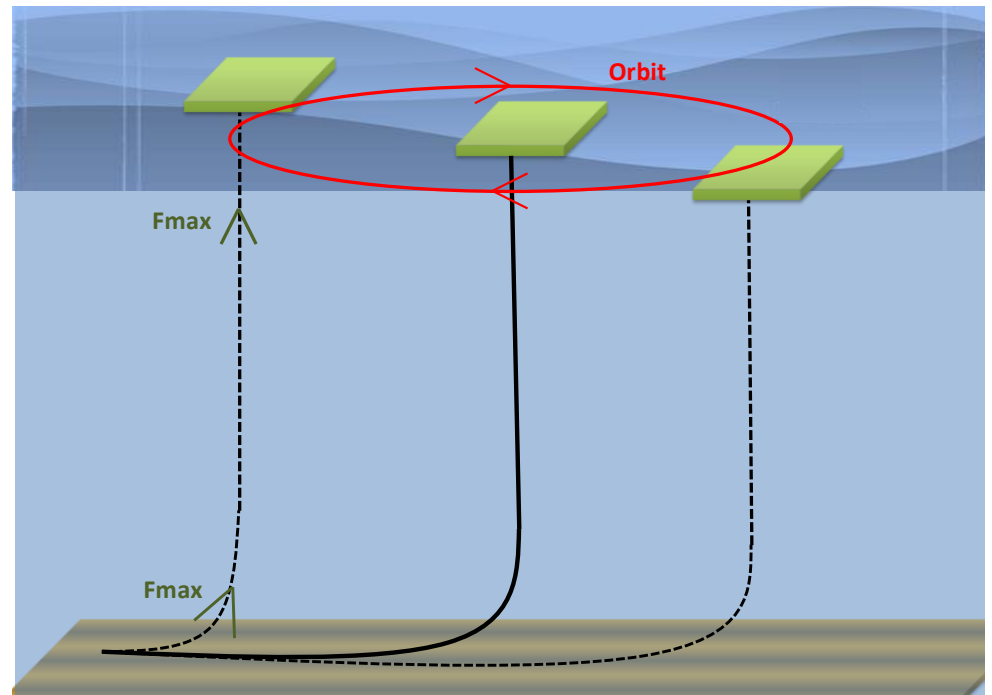
Tfi Mooring Component

- Using Multiple Materials
 - Soft materials for repeat cycle events giving long lifetime
 - Stiff materials for infrequent storm events delivering protection with minimal weight
- Compressive elements
 - Peak force protection delivered by compressive not tensile components
 - No elastomer breakages



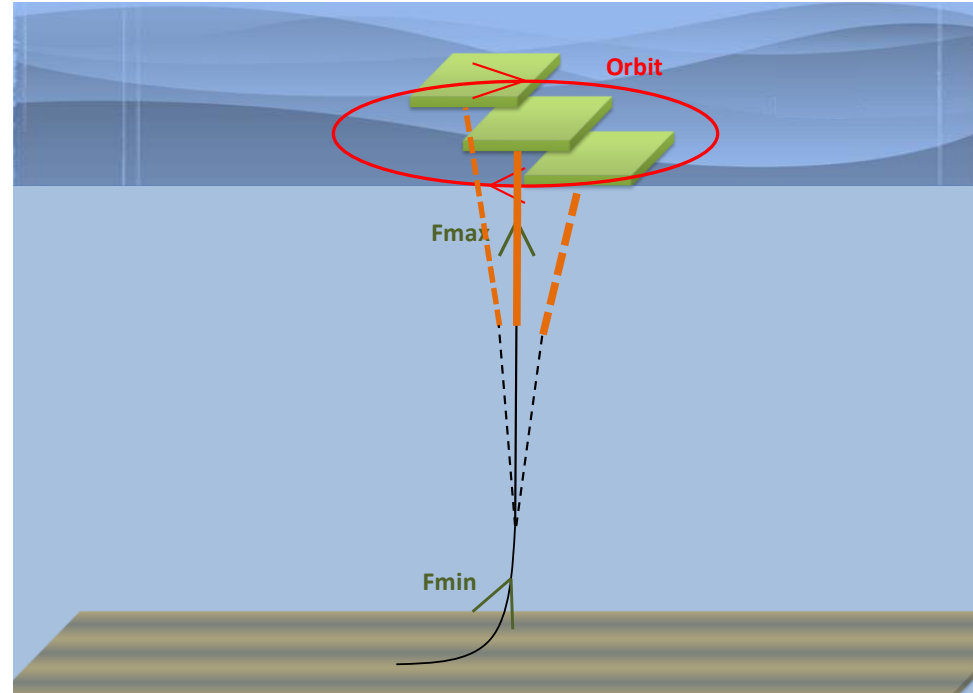
Catenary Mooring Systems

- Large footprint required to manage low scope
- Large watch circle
- High forces along entire length of mooring
- High cost per leg



Taut Mooring with Tfl Component

- Smaller footprint – watch circle
 - Can fit many more devices per seabed area
- Lowers forces along the mooring length
 - Orcaflex simulation indicates very high reductions
 - Opportunity to reduce steel structures
- Lower cost per leg
- High reliability & lifetime



The Mooring Applications

**Marine
Energy**



**Marinas &
Fish Farms**



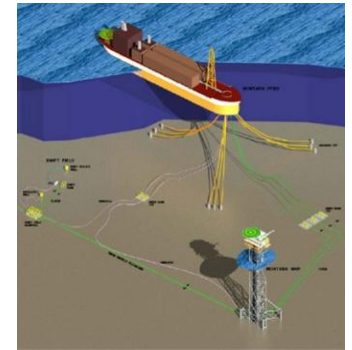
**Navigation
Marks & Data
Buoys**



**Off-shore
Wind**



Oil & Gas



Compressive Springs Opportunity

**Gas Spring
Replacement**



**Dampers and
Buffers**

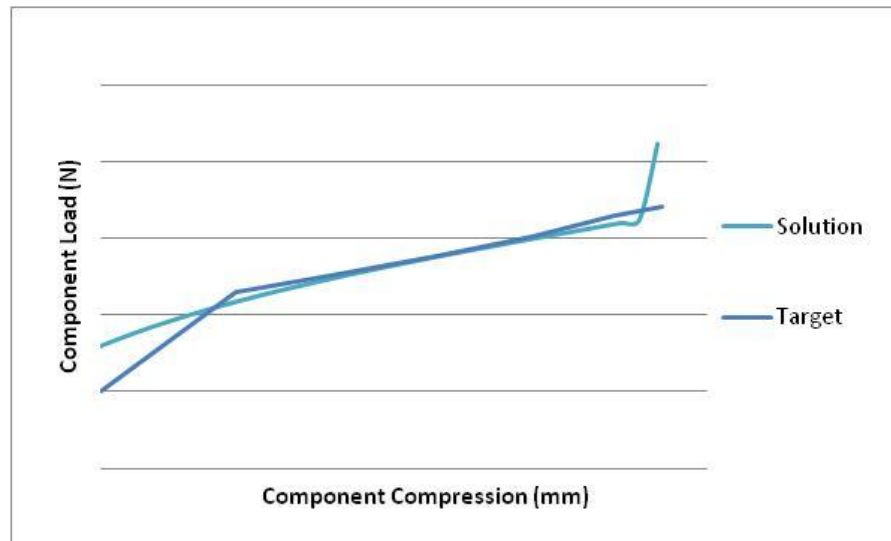
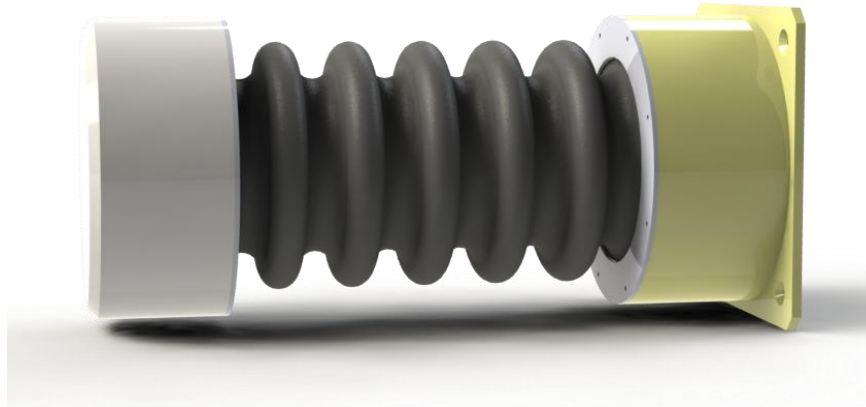


Gas Spring Applications

- Used where a controlled response to an applied load is required
- Marine renewable energy - used to counteract buoyancy or excessive wave motion
 - Aim: deliver desired load response curve across huge variations in loads seen across all wave states
 - Result: banks of gas cylinders are required
- Maintenance requirements are high
- High risk component

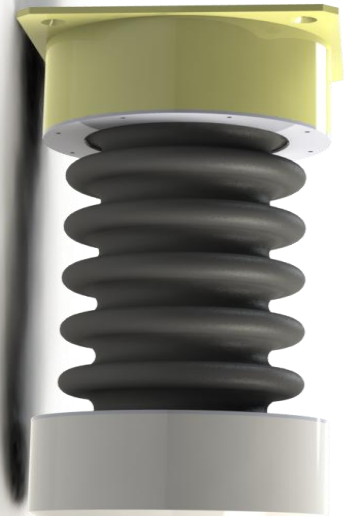
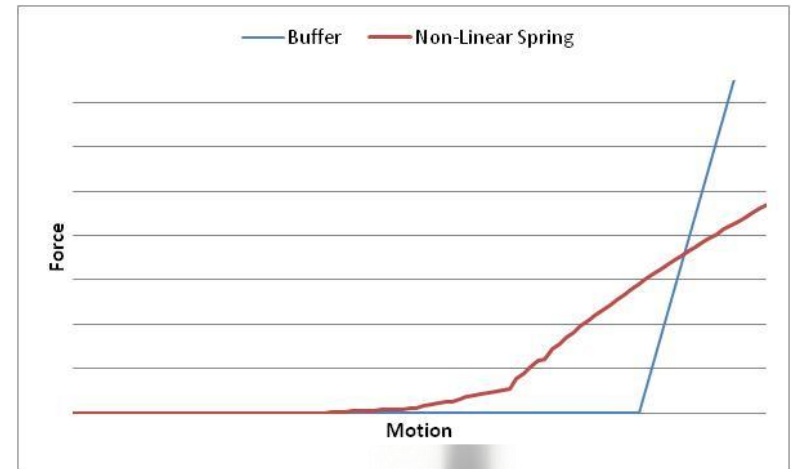


Alternative Solution



Buffer Replacement

- Replace the buffer, a component with a very stiff response at the end of the motion
- With a non-linear spring, a component with a gradually increasing response responding over part of the motion



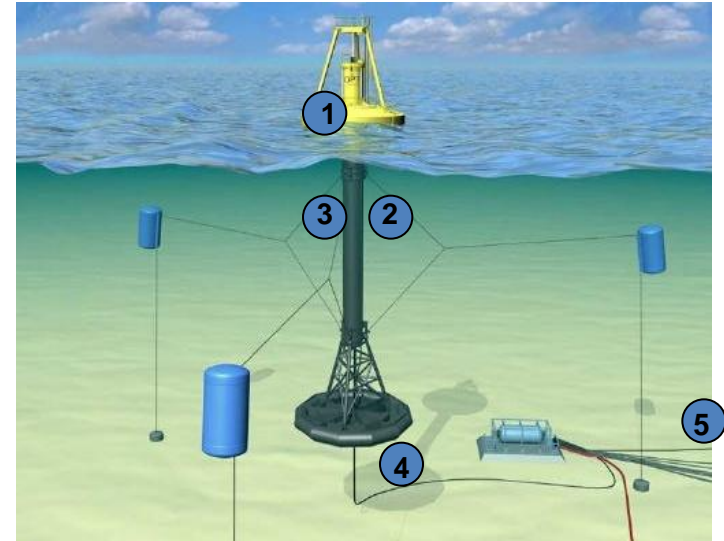
Damper/Buffer Replacement

- Non-Linear stress-strain response delivers significant benefits
 - Higher power capture
 - Lower peak loads
 - Lower accelerations
 - Lower mechanical shocks
- Passive components
 - lower O&M costs
- Reduced forces
 - reduced heavily engineered superstructure
 - lower CAPEX

What's Next for Tfi ?

Marine Energy Product Concepts

1. End Stop
2. Air Spring Replacement
3. Compliant Bearings
4. Compliant Structure
5. Mooring Tether



Mooring Tethers for applications in

1. Marine Energy
2. Aquaculture
3. AtNs
4. Oil and Gas

