SUT, MASTS and the D’Arcy Thomson Forum present:

The 10th Anniversary Special of the Salvage, Decommissioning & Wreck Removal Workshop

Thursday 10th November 2022 (Auditorium A)

**Navigating the Blue Economy through the Climate Emergency:**

**How do we achieve joined up thinking and improved decision making?**

***Welcome - Karen Seath, Chair, SUT Salvage, Decom & Wreck Removal Committee***

A walk through 10 years

* North sea very different regulatory environment
* Key area of interest is impact of manmade infrastructure on the marine environment, impact of removal
  + They have become part of the marine environment, removing infrastructure has become a debate
* In 2018 SUT introduced the topic of explosives for decommissioning
  + Very interesting panel - marine scientists, explosive experts
* Showcasing and discussing technology is a focus, simulation and visualisation have come to the floor
* Circular economy
  + Topic that was started in 2018/2019
  + Highly challenging because key driver is economics
* Climate change
  + Understanding GHG emissions
  + Thinking about use of materials

**Session 1: Energy infrastructure Use and impact: The need for better decision making?**

The energy 'transition' - are we going from the frying pan into the fire? Is it time to rethink policy?

**Chair: Petra Harsanyi, Marine Station Manager, St Abbs Marine Station**

***Abigail Davies, PhD Student, National Decommissioning Centre/University of Aberdeen: The Energy ‘transition’: Out of the frying pan, into the fire?***

* Graphs of major GG
  + CO2 increasing from 1970s
  + Methane is 8x more impactful as a GG than CO2
    - We have increased the rate of change
    - Causes impactful short term warming
    - Stays in the atmosphere as a maximum of 12 years, but can cause sig impacts in that time
  + We have collectively reduced CFC’s
* 7% of GG emissions comes from burning of fossil fuels
* Need to look at energy mix and demand
* Coal has reduced, petrol and natural gas have not sig reduced
  + Natural gas is methane, tends to leak in both upstream and downstream part of the system
* Sectors responsible for GG emissions
  + Domestic is a large part of GG emissions in UK
  + Personal responsibility to decarbonize
  + We talk about academia and industry, ignore personal responsibility and impact
* Are we really transitioning?
  + Used to produce all natural gas in UK, can control upstream and downstream emissions
    - Started importing from Russia and Norway, less trustworthy
      * 15% of Russian gas leaks
  + Need to look in gross of renewables
    - During transition has increased 5.9%, offshore wind only 3
  + Prediction that we will produce over 500 tons this year, not including imports and aviation
  + We have offshored our emissions - imported products
    - Not included in the graphs
    - Makes our emissions much higher
* Are we greenwashing?
* We don’t have good data reporting or carbon accounting
  + UK is very bad
  + Different government sectors use different methods to calculate emissions, not comparable
  + Emissions are 3x higher than reported when including upstream and downstream emissions
* Carbon capture and storage
  + Dodgy
  + Problems with leaking
  + This data doesn’t come from the operators
  + No storage so far that can actually store more than 40% of what it takes in
* Offshore vs onshore
  + Onshore higher, but offshore is harder to calculate and measure so it is underreported
* Materials
  + How we use and reuse materials (circular economy)
  + Steel easy to recycle
  + 60% of recycled steel goes to electric arc furnace, we can’t control where that goes
  + Hard to pin down emissions with transport
  + Can look at how we assign emissions to materials
    - Methodology is standardised, linear
    - Two options at end of life
      * Recycle assumes goes to electric arc furnace - false
      * Bin - materials are lost - false
    - We include IOP without understanding exact pathway of materials
      * Material value
        + Energy carbon value
      * Product value
        + Energy and carbon to create final product
      * Retention model
        + How to retain the value within the material and product

Can map pathways at end of life

Assign a value to the pathways

* + - * + Recycling takes more energy
    - Is we dispose we lose all value, recycle we lose 50% of value
      * If we reuse but move it, reuse in situ we lose zero value
  + Can end up with over 100,000 tons of CO2 for decommissioning steel jacket

***Steve Hall, Policy & Technology Consultant: Current global marine policies – Time to rethink?***

* Silos
  + We treat fisheries different from oils and gas - there should be EIAs
    - Legacy activities, get away with things
* No shortage of global marine regulation
  + Not joined up
  + Many in EEZ concerning human economic activities of various kinds
  + Handled by different orgs, disjoined, no communication between them
* Many different strands of scientific data needed to inform policy
  + Need smart and well qualified people, equipment to get this data - expensive
* Ocean is low priority compared to terrestrial
  + Don’t wait for international legislation to make things happen
  + We don’t know what’s in the deep sea
* ABNJ’s are still the wild west
  + Who’s going to enforce it?
* Leadership
  + UNESCO is UN body on ocean matters
  + Is it though?
  + No clear leading body on ocean issues - no person sitting at UN to be spokesman/woman
  + All the orgs argue they have the remit from the UN to be in charge of ocean matters
* Marine autonomous technology isn’t new
  + Torpedo, converted jet ski with transmitter, explosives, etc
  + Laws have been made, but they’ve not been updated to new technology
  + What happens if you hit the wrong target?
    - How did you discern your target
* How will lab grown fish change the fishing industry in 20 years? Emerging technologies have ability to completely transform the environment for the better
* Sea level rise? What does that do to industry (oil and gas platforms)? More powerful storms?
* Ocean needs a seat at the UN! An ocean body in the UN

***Lee Hanlon, CEO, CessCon Decom: The circular economy challenge for onshore decommissioning of offshore infrastructure***

* Circular economy is core of values
  + Need to engage with operators early
  + Need to see what can be used and removed
* Over 99% of the materials are reused and recycled
* The end of life for one thing should be the beginning for something else
  + Remanufactured, resold, returned to supply chain
  + Easier said than done
* Challenges
  + Removed two platforms
  + Can be done in 90 minutes
  + Transported to the barge, barge moored
  + Assess the structure for what can be reused
* Top town dismantle methodology
  + Lift 2 tons per day
* Every piece is identified and quantified
* Pulldown
  + Looked at explosives, stayed away from it
  + Controlled pulldown instead
* What are the real impacts, challenges?
  + Complex in planning, cost, risk
  + It can be costly to remove it
* Pump resale is 10% of new pump - small revenue
* Scrap steel (per ton) is same price as the resale pump
* So what’s the point? Why go through all the hassle when you can get scrap material for the same price?
  + Main challenge and barrier to circular economy

***Charlotte Stamper, Energy Infrastructure Lead, European Metal Recycling: A virtuous circle? Opportunities for a circular offshore renewables sector***

* What is in a wind turbine?
  + Where does the steel come from and what happens at the end of life?
  + Blades are fibreglass
  + Some very valuable materials
    - Copper, nickel, cobalt, rare earth elements in magnets
    - Minor amount but important
  + Offshore is more complex
    - Emerging technology is floating turbines
    - This will take over offshore wind
      * Can go deep
      * Huge max potential
* Offshore market
  + We need 4x increase in wind by end of the decade to accomplish goal
  + At Least 4,000 turbines in north sea by 2030
  + We need 150,000 turbines globally by 2050
  + Huge market!!
* Things we need to think about today when we implement offshore wind for circularity in the future
  + Onshore wind decommissioning happening already - we need to learn from that
    - We don’t know how to do it well
    - No one considered taking them down when they were made
  + Cannot recycle fibreglass from the blades
    - How can we recover materials from offshore turbines?
  + We have a chance to get things right
* At the start of investment in ports and manufacturing in Scotland
  + Huge of investment
  + Wind turbines are replicable
    - Should be an opportunity for UK supply chain to do serial manufacturing
    - Need to couple decommissioning with next generation infrastructure when designing our ports
    - Cannot rely on other people to manufacture them - the world is an unpredictable place
      * Do we want tore ly on China to get the rare earth elements needed to build them?
* Offshore wind farms need substations
  + A lot of the same infrastructure as offshore oil and gas is used for offshore wind
  + What strategies and policies do we need for successful reuse?
* Workforce
  + We need to help people transition
  + Massive skills gaps on offshore wind, but skills are present in oil and gas
    - Needs to be transferability
    - Need to transition while retaining key knowledge and skills from offshore oil and gas
* It will be difficult to keep supply up with demand of some of the materials and rare metals needed
  + If we can embed circularity we can retain materials
  + Need to plan now for our material needs in the future

***Discussion/Q&A***

* Is the potential for a circular economy there so we don’t need to procure more rare metals? What evidence do we need? Do we have enough of the rare earth elements?
  + We should be eliminating these metals from our technology in the future, redesign
  + Try to avoid deep sea mining at all costs
  + Should we all assume that we can have electric vehicles? We don’t have the resources to replace all vehicles with electric vehicles currently
    - They are still a drain
    - Need to reframe the discussion
    - The right design and the right policy should be enough to procure the elements we have
    - There is a lack of design for the reuse and recycling
  + With the pace we need to implement wind turbines do we have the time to figure this out?
    - The renewable has reduced its cost, the focus is not about it’s sustainable growth
    - The onus is on the renewable sector now
    - Take time now to discern where the emissions are and avoid it in the future
  + How are the new platforms designed to allow for decommissioning?
    - Nothing has changed
    - Some parts easier to remove, method and sequence has not changed
* In terms of making the seabed safe for fishing (snagging), what measures are being taken during decommissioning?
  + Clean seabed is ideal
  + Still conversation about leaving materials that are part of the marine ecosystem
* How has the design of wind turbines changed over the last 30 years?
* There’s been many stop/starts with transitioning to renewables
  + Pace needs to be faster
  + Still talking about starting
  + Can we think more long-term? We have a small carbon budget left to use. Can we think about 100 years into the future?
  + There is a system change needed (public transport) but we still think in terms of just replacing our current structures, taboo subject
  + We could build things that are built to last longer
  + Things need to be local, need to be accessible to sustainability
* Where does the recycled material go?
  + Sell steel to EMR
  + Steel is global commodity, will be exported to places that will pay the most
    - Needs to be more local
    - Economic reasons that’s not happening

**Session 2: The Marine Ecosystem – do we properly explain the intrinsic need for protection?**

What changes have to be made to promote prevention rather than cure? Have we changed our view on the value of biodiversity following the Dasgupta Review?

***Chair: Nigel James, Master Mariner / Director, Waves Group - Opening: Prevention rather than cure? A Master Mariner’s perspective***

* What are we protecting it for? What are we protecting it from?
* Need to think differently
  + Lessons learned
  + New technology
* Container-stack collapses
  + Even one or two stack collapses is a big job
    - Each one is the side of a truck
    - Example holds 7,000 containers, lost over 1,800 over the side, rest scattered on deck
    - Is there something we can do to mitigate these losses?
      * Mitigation of synchronous rolling and parametric rolling
        + Reason for stack collapses
      * Want something easy to understand, can put on a piece of paper
      * Produced chart for each vessel based on vessel metrics and wave factors
* Fire on container ships
  + Nitric acid leak on board
    - Ports wouldn’t accept it, has to go around with this nitric acid leak
    - Situation got out of control
    - Vessel caught fire and sank
  + We carry everything on container vessels
    - Every dangerous substance - acids, explosives
    - Things end up in the sea - plastic nurdles
    - Wildlife severely affected
  + Thermal sensors are required to be carried for firemen
    - Ships are required, most don’t carry them
    - Smaller than mobile phone, half the price
    - Allows you to find the fire
* Prevention rather than cure on ships

***James Herbert, Secretary General, International Salvage Union: Lloyd’s Open Form and the role of the marine salvage industry in the preservation of marine ecosystems***

* Marine salvage is practice of going to aid of vessels in distress
  + Usually done on commercial basis
* Very small numbers of large players able to operate globally
  + More regional operators
  + One port or one part of the world operators
* ISU does about 200 salvage operations a year, $500 million gross income
* The commercial industry is the difference between a casualty and a catastrophe
  + Calling in marine salvage should be first priority, not last resort
* Salvage vessels keep ports open and industry alive
  + Suez canal example
* Policy
  + IMO
  + Council of Lloyds
  + No cure no pay
    - If they aren’t successful with the salvage they don’t get paid, based on value of the cargo and vessel
  + Contract is Lloyds Open Form (LOF) for 100 years
  + Article 13 of salvage convention determines the price of the salvage
  + Article 14 awards
    - Special awards for situations where vessel is not saved, but time and resources were put into trying to save it
    - Did not work well
    - SCOPIC regime introduced
      * Salvals can invoke clause to get some time and money for the job even if not successful
  + Damage to the environment is paid for by P&I clubs
    - Invoke Lloyds open form because it is an immediate response
* ESG approach beginning to be taken seriously
  + Enables harmful substances to be carried at sea?
* Graph showing the substances involved in cases they have
  + Shows why we need the salvage industry to prevent these substances going into the sea

***Mike Elliott, Chair in Estuarine & Coastal Sciences, University of Hull: The value of biodiversity – A scientist’s perspective***

* We have a link between the ecological and societal services and benefits
* Within the context of oil and gas
  + Decision levels we go through to determine where the environmental effects are coming from
  + How do they affect the biodiversity
  + Every activity is a detailed part of decommissioning
* We need to value how pressure are changing the biodiversity, and the effort we go through to prevent them
  + How is the marine ecosystem functioning changing
    - How are our benefits changing
  + Protecting ecosystem services misses the point
    - We need to consider what is the ecosystem doing that’s important
* Framework for how we value that and how we communicate that value
  + How do we value ecology?
  + How do we value the effects on biodiversity?
* In the light of petrol
  + If the marine ecosystem is functioning we get ecosystem services
    - Fish
    - Fish gives us birds
  + We build boats to catch the fish, we put in human capital
  + We build restaurants, we find value in it
* We can value the ecology part
  + We have socioecology valuation - ecosystem services
  + Socioeconomic valuation
  + How do we value these different parts
* How we value the ecology doesn’t relate to money
  + What is the fragility and irreplaceability of a habitat
  + Vulnerable and sensitive? To what?
  + Ecological valuation is important, but we are not valuing in monetary terms
* Socio Ecological valuation
  + Starts linking ecological valuation to what we want from the environment
  + Anthropocentric view but most people think this way
  + How do we value the ecosystem services?
* Socioeconomic value
  + Where politicians take notice
* We often stop at the monetary, material, tangible valuation and ignore either values
* The way we think about biodiversity needs to build in natural and economic valuation
* Can have good economy without good ecology, but it won’t be sustainable
* Natural capital
  + Didn’t come out of the environment monetary came out of the treasury
  + Are we protecting natural capital for the benefit of the economy or the planet?
  + Now it’s used in regulations
  + What assets do we have in the sea, what are the flows and the benefits
  + Ecologists now use economic terms - assets and flows
* Now we indicators for all of these aspects
  + Natural capital accounting
  + Matrix approach
    - How do we measure our biodiversity, how do we link to ED, how do we link to societal values
* Ecologists and economists want things to happen different
  + How do we merge them
  + Different currency for each, on either side of the equation
* Horizon Europe is developing these methods

***Moya Crawford, Managing Director, D’Arcy Thompson Simulator Centre and Deep Tek: Where we are with the Hazardous and Noxious Substances (HNS) Convention – How does this fit in with the opening up of the NE Passage?***

* When we talk about the passage of noxious substances we need to talk about fuel
  + Bunker oil, refined hydrocarbon
* Offshore floating wind will be subject of salvage
* No one mentions nuclear, taboo subject because not a part of Scottish gov policy
  + Not allowed to discuss nuclear as part of energy mix despite the low carbon footprint
  + Need to question it
* What will our benchmark be to start salvage before the damage?
* In the example
  + Trawler on shallow rocks by Norway, Svalbard
  + Salvage contractor went out (January, dark and cold in Arctic)
    - Went with high power ice breaker
    - First removed pollutants, used young naval recruits
  + Successful salvage mission
  + Lots of negotiation, really wanted to remove all pollution
  + Wanted to get best methodology for the wreck removal
    - Survey data (drones, ROV)
  + Two seasons to remove the wreck
    - Had to be cut up
    - Manage ice flow, make sure work is safe, unpredictable weather

***Discussion/Q&A***

* Case history of natural accounting that shows a different outcome from commercial accounting?
  + Been used in a few countries, not been used properly on the marine system
  + Been used more on terrestrial systems
  + Not sure if it will work on the marine area
  + LOF allows salvage industry to get reward for protecting marine environment
    - Creates space for a discussion of the natural capital
    - Need to put the expertise back in this industry
    - How with natural capital accounting methodology how can we take that back into the marine salvage industry?
      * Biodiversity accounting, biodiversity credits would be a mechanism
  + How to include the larger impact of biodiversity loss within accounting
    - The effects are larger reaching than just where the event happens
  + Society needs to put pressure on ship owners to use professional salvage operators
* Natural capital versus natural real estate?
  + Real estate is just part of capital
  + We talk about social, economic capital and we want to bring all these together to ask how we can value a system in ways other than just GDP
  + Fish are natural capital, not real estate
* In terms of getting the salvage operator in requires a lot of resources
  + Open question about whether the industry can respond globally
  + Big issue for the Arctic - Russian ICU suspended, so now there is not a member of the NE passage to respond there
  + The industry is under threat therefore the environment is under threat
* James was at the IMO yesterday
  + Session of the maritime safety committee
  + Pleased to see that large part of member state delegates stayed for the talk about marine salvage, and a range of the NGOs, seem to take it seriously
  + We think about states that are well organised for marine casualties, but the majority are not organised around it and need consultants

**Session 3: Exploration and Removal of Wrecks and Offshore Structure: Technology and Data**

We take you to the depths to explore the latest expedition to the Titanic; discuss what elements of 'legacy wrecks are environmental hazards; and share how state of the art visualisation and simulation can inform responsible decision making.

***Chair: Andy Matkin, Commercial Manager (Environmental Services), Fugro***

***Murray Roberts, Professor of Applied Marine Biology & Ecology, University of Edinburgh: Exploring the Titanic – the 2022 expedition***

* What does the titanic wreck have to do with marine colonisation
* What does it cost to dive the Titanic?
  + “Mission specialists”
  + $250,000 for one dive
* 2022 Titanic exploration
* Bringing scientists, explorers, deep sea enthusiasts
* Biodiversity on the Titanic
  + No eDNA ever taken before
* Rare to see sites like the titanic wreck
  + Building a time series
  + Larval dispersal
* Role of the structure as an artificial reef?
  + Working with archaeologists
  + Information on how the deep ocean is acidifying
* Connectivity patterns different dependent on models, learning about validity of the models
* Went in sub to explore mystery wreck site near the Titanic
  + Turned out to be rocky substrate
  + Lots of life growing on it
* More rocks in the deep abyss than we thought
  + Helps us to understand species dispersal across the abyssal ocean
* Need to id and quantify what we know, what is there, what grows on the Titanic, eDNA, water samples
  + Cannot sample from Titanic!
* Make data available to the scientific community
  + Need to be in public repositories

***Juha Flinkman, Finnish Environment Institute SYKE: Legacy wrecks as environmental hazards in the Northern Baltic Sea – Case Gulf of Finland***

(most explanation is on the slides)

* Lots of wrecks in Northern Baltic
  + Popular trade route
* Gulf of Finland
  + Lots of trade, lots of war
  + Difficult to navigate
* Up till now it was no one person's responsibility to collect data on these wrecks
  + Now it is the SYKE
* Two periods stand out - the world wars
* Environmental threats
* Most environmental wrecks are warships
  + They don’t have to follow marine pollution conventions
  + Careful methodology to operate wrecks
* Can find grey seals caught in trawl nets that died, they don’t decompose very fast in the deep sea
* UXOs and ghost netting, chemicals must be assessed - risk of the wreck to the environment
* Salvage must be carried out to remove these threats
  + Pre salvage survey costs a lot of money, need to figure out how to do it or employ consultant company
* They’ve done all the easy wrecks, all that’s left are the more dangerous and deep wrecks, war graves
* Tools include archival reports, drawings how outlay of bumper tanks and damage to the ship, where the fuel and explosives might be

***Mark Lawrence, Lead – Digital Services, Waves Group: How state of the art Technology and Visualisation can help inform decision making***

(most explanation is on the slides)

* Risk assessment
  + Trying to understand the likelihood of release of hydrocarbons and calculate overall risk of environmental impact
  + Overall risk
* Data driven decision making
  + Integrating and interpreting data, bringing datasets together generates situational awareness
  + The context of it is to use that to develop proposals, communicate and determine cost to remedy the situation
  + That allows the application of quantifying risk
* Approach to stages of intervention
  + Want to find the lowest possible cost and risk per time to remove wrecks
* NBS to determine where hydrocarbons are
* Modelling the wreck to determine structure, damage, holes, and sample
* Found area of wreck that was leaking oil
  + Oil spill determined

***Will Black, Decommissioning Project Manager, EnQuest on behalf of the Subsea Decommissioning Collaboration (SDC): A collaborative operator approach using innovative supply chain technologies***

* What is Subsea Decommissioning Collaboration
  + Opportunity to share and be transparent about $1 billion and 15 years of work - huge scale
* Where did it all start?
  + OGA went to operators to ask how to maximise recovery
  + How can we optimise decommissioning in Eastern Shetland
  + Scope increasing
  + Only working group left from the initial initiative
* Opportunity in the scale, partnerships, transparency to supply chain
* Want to make it a sustainable solution, new technology
* Data is all online on NSTA website
* What have we done?
  + Had to change mentality and go to supply chain
  + Put forward the problem, opened portal for people to post ideas
  + Categorise ideas
  + Reviewed ideas
  + Has 1 to 1 with every supply chain on their ideas
  + Developed plan on that
* What does success look like on a high level?
  + Willing to take risks to try something new, supply chain needs to understand that
  + Need to consider emissions during decommissioning so they can be net zero
  + Make clear they want to set up the supply chain during the whole journey
* How to inspire industry
  + Webinars
  + Meetings
  + Getting out to supply chain
* Market responses
  + Want to make sure that ideas stay to the company, not shared elsewhere
  + Assess scoring criteria, how to move forward on that basis
    - Remove the subjective part
* Two screen workshops
* Have we got game changing ideas?
  + No silver bullet
  + Good initiatives and ideas, positive response about collaborative way of working
* Development plan
  + How to take ideas to the next level - economic level

***Discussion and Q&A***

* Opportunity to improve the EIA collaboratively? Collaboration in decommissioning?
  + Collaboration easy in decommissioning because there’s no commercial gain
* Carbon accounting in plans?
  + No, but want that to be part of the decision making
* Could deep sea tourism fund deep sea research?
  + It already is!
  + It’s great to see people dive deep sea coral reefs
  + How can we make this an experience? How can the scientific community benefit?
* How is the data normalised to contractors understand what it says?
  + Standard data on form that is posted on NSTA website
* Murray - will you go back to Titanic?
  + Plan is to go back each year
  + Cannot sample, highly controversial, but we need samples for science
    - Tension in that discussion
  + There are people who are not super rich who will spend all their mortgage to dive the Titanic
* Mark - can you determine when an oil leak will happen in a wreck?
  + Data is advancing very fast
  + Depends on the scale of the damage hard to determine though
  + Orientation of the wreck can be more structurally sound

**Session 4: Moving the Conversation on by Tackling Tough Topics**

Explosives and UXO's - we look at a changing story over time and new technologies for removal; and how the strength of partnership helps us address the long term negative impact of munitions and ordnance.

***Chair: Rachael Sinclair, Senior Scientist, SMRU Consulting***

**Part 1: Explosives and UXO’s – A changing story**

***Alison Brand, Managing Director, Manta Environmental: A look back, and how EDGAR (Explosives use in Decom, Guide for Assessment of Risk) enables the future***

* XCOM
  + More interested in small explosions
* Current industry perception at first
  + Explosives banned - too risky, need to be very tested, etc
* Relevant regulations
* Industry guidance
  + Need to look at all the options - evidence and argument
* Explosives
  + Economic benefits but use must be justified
* Use 10 values of adaptive management
* Underwater noisier
  + Seismic, sonar, pipe laying, shipping
  + Disrupt underwater communication from marine species
  + Look at sounds SPLs and SELs
  + Duration activity takes
  + Strikes and cumulative - SEL
  + Lower levels for longer durations might have similar effects of higher level sounds shorter duration
* What are we looking at?
  + Burst of energy
  + Short shock waves
  + Waves reflected or refracted
* We need data for the model
  + All projects are from the States
  + Need a concept
    - Concept diagram
    - How many activities per event?
    - Species present? Densities? Acoustic impact criteria?
    - Potential impact → number of individuals impacted per species
  + Model should be transparent and minimal input for the user
* Initial concept
  + Found that the initial source level and sound pressure levels gave SPL peak
* User can see radius of impact, cetacean abundance
  + Computes risk assessment for marine mammals
  + Assessment for marine management units
  + Build something that is built for purpose
    - A tool to see if it’s reasonable as first stop model
* Since building EDGAR
  + Publications on sound pressure levels and sound exposure levels
  + Impact?
    - 1,000 full text views in a year
  + Models for seismic survey, impact piling

***Lisa Zardoni, Decommissioning Engineer, North Sea Transition Authority: Driving efficiencies with the right decom toolbox***

* Decommissioning strategy
  + Target of 35% reduced decom cost by next year
  + Objective to have it carried out in cost effective way
  + 4 strategic areas
    - Planning for decom
    - Commercial transformation - decom executed at scale
    - Repurposing infrastructure
    - Work with industry to promote development and implementation of technologies
* The right toolbox is the one with the most tools
  + Scope can be technical, commercial or regulatory
    - Can be proven technology or newly developed, or under development (need all in the toolbox)
  + Accepting some inefficiencies, but choosing best for the job

***Richard Battrick, Managing Director, UXOcontrol: Regulatory framework for UXOs, scoping magnitude of problem, differences between explosives and UXOs***

* Help inform legal frameworks
  + National frameworks give good informative work plans
  + BREXIT will change UE regulations
* Transportation
  + Still under EU frameworks for transportation
* International frameworks
* Best Practice
  + Protocols when working on land
  + Contamination from bombs in the wars
    - Sanitise the land to give back to the owners for use
  + Same methods in the marine environment
* NOS
  + Code of practice not taken up by industry
  + Not UXO trained or qualified
  + Most UXO practitioners come from the military
* Low and high explosives
  + Low doesn’t detonate, burns quickly
  + High does detonate
* Black powder
  + Coarse grain is steady burn
  + Fine great is quick burst
* Nitro-glycerine
  + Waves go through the environment
* Changes based on environmental conditions
  + Sea mines differ in dimensions, can ID
  + Different types of mines
* Land mines
  + Built at sea
* Torpedoes
  + Ship torpedo weapon systems too
* Magnitude of the problem
  + Historic ordinance is not accounted for
  + Lots of contamination
    - Nuclear waste
    - 147,000 tons in 1947 dumped
    - Dumping sites all around the world
  + Wrecks eroding, so are bombs
    - Collapsing and becoming unstable
    - Needs to be dealt with
    - Threat is not gone, practices allow for the dumping still
* Modern commercial challenges
  + Subcontracted mechanism
  + Use cheap equipment
  + Take the risk on board
  + Struggle to get people to engage
* Vessel management
  + Challenge in the industry
  + Vessel prices change, need to procure vessel in advance
  + Different sensors, different metallic content
    - Important to understand what you’re dealing with
* Use Utility ROV System (UTROV)
  + Need to remove obstacles – transfer and lift
* Weapon selection is a problem
  + Need to understand the weapon system used for environment
  + Need to have functional equipment
* Need to use doner charge, but don’t want that impact on the environment
  + Plan for low order unless high is required
* Cobra
  + Explosive charge directly on the items
  + Don’t want it dispersed around the ocean floor, in propellers
* Analyse carbon footprint of the tools in the toolbox
* Equipment lifecycle
  + Pinch Point with licensing framework, might be just for 24 hours
  + What’s the environmental life cycle?

***Discussion/Q&A***

* Who pays for UXOs? Who decides which ones are used?
  + Energy companies pays
  + Third party consultant advises on UXO operator
* Are there parts of the EIA that are kept quiet?
  + Distrust with explosive engineers from the military and industry
  + If you own the survey data you can make decisions, generates trust
* Is the government trying to clean up historical dump grounds?
  + There is a degree of ownership, but it’s not a priority

**Part 2: Driving topical discussion forward across the ‘Quadruple Helix’**

***Moya Crawford, President, SUT: The SUT Special Interest Groups, the strength of partnership, and looking forward***

* Need coherent policy that isn’t sectorally oriented but around water, the medium that sustains life
* How do assurance, insurance and finance affect what we do?
* We are the ones that must make the decisions, and cannot always look to the government. Their ability to affect change is limited
* Need to choose a number of subjects to move forward
* Big one is education and skills

***Dave Paterson, CEO, Marine Alliance for Science and Technology for Scotland (MASTS): Thoughts from the two workshops – Open discussion***

* MASTS promotes excellence in marine research but also supports government policy
* We are in Phase 3, where there is commitment of 80 partners to continue over the next 5 years but without gov funding
  + Not strong enough in the T of MASTS, technology and business
* What are the real objectives of the work - how to project environment and economy
  + Meetings like this bring together academics, government and industry
* Setting up networking tool called “Ocean Partnerships” with weeks and monthly meetings