**Working Group 3: Risk assessment, risk control etc.**

EB – what space needed for safe shipping? Required width of shipping lanes, safety margins, emergency manoeuvres. How can shipping safety be evaluated ? What measures can be taken to improve safety ? What will be the final turbine layout ?

Corridor widths - DP would like to see actual guidance eg. 2M separation from farm, RB noted own & NL studies, KJ noted differing manoeuvrability of vessels, sometimes TSS or formal schemes complicate issue,

* PIANC Guidance (for design of access channels)
* Based on traffic lanes, separated by safety margins
* Width of individual lane based on most demanding design ship

Some choices

* Measure lane width to exclusion zone or to first turbine mast
* How many lanes needed – traffic density, vessel mix
* UNCLOS allows for limit for navigational safety (500 metres for oil & gas)
* Is this applicable to turbines ? can it be included in 2 mile safety margin. Is it wise to constrict vessels into small area by large safety margins ? turning areas in canals ? consider traffic densities, UKC, MGN371, concentration of fishing vessels, IWRAP,
* Allow navigation in wind farm areas? – allow fishing ? Restrict entering shipping lane from within wind farm areas ?
* Should WG try to produce guideline or case study ?
* MGN371 currently being rewritten to cope with larger OWF.
* Need approx 6x length of vessel to turn (might be different for stbd/port turns)
* Different levels of alert on bridge depending on identified phase of voyage.
* Effect of weather on turning
* NL guidance (in Dutch only?)
* Germany bans fishing vessels from operating in or transiting OWF
* Leisure craft may be safer within or near OWF; could have identified entry & exit points; is it practical to enforce ? Unlikely to have guard vessel after construction phase. Possibility of narrow channels for say, FV, may need to mark turbines within farm.

Risk assessment – risk calculations; compare situation with & without objects – how to predict traffic patterns and distributions in the proposed situation ?; Expert sessions – involve stakeholders, commitment to outcome, worst thinkable scenario, vs. risk approach, use of IALA toolbox

Risk based vs Worst Case scenario

* ALARP
* Number of passages per year
* Distribution of passages during the year
* Ship types and speeds

Risk Mitigating Measures

* Add AtoN; does more=better?? Effect on risk? Chemical industry 10-6 (per year ?) acceptable level of risk; 10-5 for people involved (as they have opted to accept risk), what is baseline risk ?
* VTS – legal aspects (only valid within 12M), voyage planning (different interests), possibilities for AIS Base Stations, radar scanners, VHF relay stations
* Traffic Routing Measures, TSS, ATBA, Recommended route

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Can brainstorm bullet-point list of potential risks and mitigations

NL 2mile safety margin based on 400m long ship, 0.3M off track when they start turn, plus 500m safety zone. separation of 2 ship lengths based on PIANC (12 kts, force 7, 3m wave ht, current, dangerous goods etc.) . Can adjust number of ship widths required depending on traffic (2 way, more than n vessels/year, types of vessel,

Belgium require turbine blade turning circle to be within OWF boundary.

Consequences of impact with turbine ?

Grounding zone (as with some bridges) ? would be very expensive

Difference between narrow harbour entrances and wind farm transits (pilot, tug, manual steering, lookout, EOOW etc.)

Scenario based on 1 hour breakdown (NUC), what happens depends on wind strength & direction, space required for anchoring etc.

Different criteria situations in Guideline 1018 (Risk)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Germany requires sonar buoys on corners of platforms, turbine fields for submarine navigation; Estonia has unidentified (?) submarine encroachment

Aquaculture sites getting larger and further offshore (25M).

Role of AIS as a contingency measure, only activate when outside guard zone ? Developers in Germany have to mark various sites with AIS; tend to transmit 1 real & 3 virtual from each station – cuts installation costs.

**References:**

UKC paper

MGN371

PIANC

RB / NL channel width studies