

2nd NCWG MEETING
Monaco 26-29 April 2016

Paper for Consideration by the Nautical Cartography Working Group (NCWG)
Suspended Submerged Pipelines

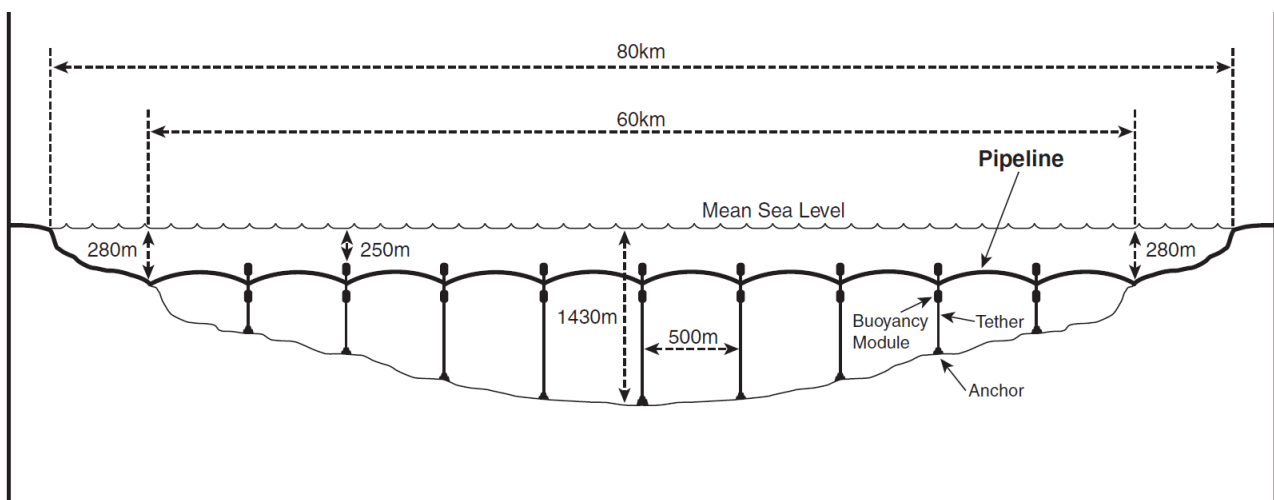
Submitted by:	NCWG Chair
Executive Summary:	New charting specification is required for depiction of suspended submerged pipelines on nautical charts.
Related Documents:	HSSC7 Minutes.
Related Projects:	S-4

Introduction / Background

The Turkish Office of Navigation, Hydrography and Oceanography was required to depict a suspended submerged pipeline on their nautical charts. This paper summarises the discussions that took place at HSSC7 between the NCWG Chair and Delegates from Turkey, with the assistance of other charting technical experts by correspondence, to provide specifications allowing Turkey to depict the pipeline on their charts. It is recommended that these specifications be adopted for S-4 and supplied to the ENCWG and S-101PT for inclusion in S-57 Appendix B.1, Annex A – *Use of the Object Catalogue for ENC* and the S-101 *Data Classification and Encoding Guide*.

Analysis / Discussion

The construction of a suspended submerged fresh water pipeline by Turkey required guidance as to how to depict the pipeline on nautical charts. The pipeline is “inversely suspended” – that is anchored to the sea floor at 500 metre intervals in depths deeper than 280 metres with large buoyant “pontoons” on the anchor hawsers, a little below the actual pipeline, so that it is submerged to a minimum depth of 250 metres:



The pipeline is no danger to surface vessels, but it is potentially a danger to submarines, and submarines and deep trawlers could be a danger to the pipeline.

Discussions between the NCWG Chair and HSSC Delegates from Turkey, with assistance by correspondence from nautical cartographers from UKHO and NOAA, developed interim charting specifications during HSSC7 (November 2015) for paper chart and ENC to allow Turkey to insert the pipeline on their charts. These interim specifications are included at the Annex.

[NOTE: When implementing this guidance for ENC, Turkey identified that the attribute PICREP (pictorial representation) is not an allowable attribute for the feature **PIPSOL** (pipeline, submerged or on land). The recommendation from Turkey is that the reference to the tiff file containing the diagram can be carried by a **CTNARE** (caution area) feature covering the pipeline (NCWG Chair note – an alternative is **M_NPUB** (nautical publications meta feature)].

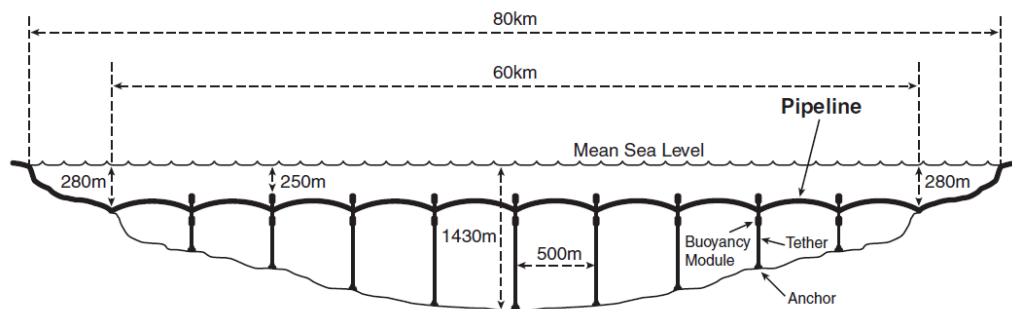
Conclusions

The requirement for Turkey to include a suspended submerged pipeline in its nautical charts constitutes an emerging requirement that requires specification in S-4, S-57 and S-101

Recommendations

1. That the NCWG consider new guidance (suggest as new clause B-444.9) similar to the following:

B-444.9 **Suspended submarine pipelines** are pipelines that are ‘inversely suspended’ – that is anchored to the sea floor at regular intervals with large buoyant ‘pontoons’ on the anchor hawsers, a little below the actual pipeline, so that it is submerged to a designed minimum depth. These pipelines do not generally constitute a danger to surface vessels, but are potentially a danger to submarines, and submarines and deep trawlers could be a danger to the pipeline. A sample schematic diagram of a suspended submarine submerged pipeline is:



Suspended submarine pipelines must be shown, where required, using the appropriate pipeline symbol as specified in clauses B-444.1 and B-444.2 above. To indicate the minimum design depth of the pipeline, a legend similar to *Water (submerged 250m - see Note)* must be placed along the pipeline, repeated as required if the pipeline extends across a substantial area of the chart. A cautionary note should be charted, for example:

WATER PIPELINE

In depths greater than 280 metres the pipeline is anchored to the seabed at 500 metre intervals, so that it is submerged to a minimum depth of 250 metres. Mariners are advised not to anchor or trawl in the vicinity of submarine cables and pipelines.

If there are other conventional pipelines shown on the chart, the last sentence of the note should be excluded, and a generic pipeline note, such as that shown at clause B-444.1, positioned immediately above or adjacent to the suspended submarine pipeline note.

A pictorial representation of the pipeline, for example as shown above, may be included in addition to, or in lieu of, the note, in magenta. If the diagram is included in lieu of the note, the legend along the pipeline symbol should read similar to *Water (submerged 250m - see Diagram)*.

2. That the NCWG task the ENCWG and S-101PT with adopting ENC encoding guidance for S-57 and S-101 as shown in the Annex, consistent with the approved specification for S-4 (noting however the observation that the attribute PICREP is not an allowable attribute for **PIPSOL**).

Justification and Impacts

A real-world instance of a suspended submerged pipeline already exists, and as it may be a danger for subsurface navigation and susceptible to damage as a result of subsurface activities, there is a requirement for these features to be charted.

Action required of NCWG

The NCWG is invited to:

- Discuss** the requirement to provide charting specifications for suspended submarine pipelines.
- Discuss** the recommendations in the paper.

- c. **Task** the ENCWG and S-101PT with developing corresponding encoding guidance for ENC.
- d. **Determine** additional action as appropriate.

Annexes:

Recommended charting guidance for suspended submerged pipeline – HSSC7

Recommended charting guidance for suspended submerged pipeline – HSSC7

Noting that the pipeline is “suspended” in the water column and therefore susceptible to lateral movement due to the influence of tide and currents, the position of the pipeline should be as supplied by the relevant authority (I would assume that this would be based on engineering drafts or post-pipeline laying survey indicating the location of the subsurface buoyant “pontoons”).

ENC:

Encode a **PIPSOL** line object, having the following attributes (based on diagram supplied):

CATPIP = 6 (water)

DRVAL1 = 250

DRVAL2 = 280 [optional]

PICREP = [reference to tiff file containing the diagram (no requirement to include the image of the note, as it is included in TXTDSC)]

PRODCT = 3 (water)

TXTDSC = [reference to text file containing the content of the note as shown for the paper chart note below]

I would recommend that you load the ENC cell into an ECDIS prior to publication to ensure that when opening the referenced PICREP file, it is legible for the mariner, in accordance with UOC clause 4.8.20.

If a regulatory authority has defined an area (e.g. within 500m of the pipeline) where a restriction exists (e.g. no anchoring), an appropriately encoded **RESARE** area object should be encoded in accordance with UOC clause 11.1. However given that the “suspended” section of the pipeline is in > 280m depth, this may be unlikely.

If the scale permits and desirable, the individual subsurface “pontoons” may be encoded as **OBSTRN** point objects as described for subsurface ODAS in table 12.3 at UOC clause 12.4.1 (the attribute INFORM should be populated similar to *Subsurface pipeline pontoon*. This may be overkill though, assuming that the plan diagram is included as referenced by PICREP.

Paper Chart:

Depict the pipeline using symbol INT1 – L40.1.

Add the legend *Water (submerged 250m - see Note)* along the pipeline. If the pipeline extends across a substantial area of the chart, the legend may be repeated. If space is restricted, you may choose to exclude the part of the legend “*submerged 250m -*”, as this information is contained in the cautionary Note (see below).

Add the cautionary chart Note similar to:

WATER PIPELINE

In depths greater than 280 metres the pipeline is anchored to the seabed at 500 metre intervals, so that it is submerged to a minimum depth of 250 metres. Mariners are advised not to anchor or trawl in the vicinity of submarine cables and pipelines.

If you have other (conventional) water pipelines on the chart, you may exclude the last sentence in the sample note above in lieu of including a generic **SUBMARINE PIPELINES** note which includes this sentence.

If you wish, you may add as a “view” the plan view of the pipeline as included in the diagram (without the note). To be consistent with all other aspects of the portrayal, I would suggest that the “view” be in magenta.

If a regulatory authority has defined an area (e.g. within 500m of the pipeline) where a restriction exists (e.g. no anchoring), the restricted area should be depicted as specified at S-4 – B-439.3.

For paper charts, I do not think there is any requirement to show the individual mooring subsurface “pontoons”.

In preparing this guidance, I have consulted with other nautical charting technical experts, including the NCWG Secretary in regard to paper charts (see below for response on the UK decision on depiction on their reproduced chart(s)) and NOAA (US) for ENC encoding guidance. This issue will be included in the agenda for discussion at the

NCWG2 meeting, to be held at the IHB in April 2015. I recommend that Turkey provide representation to this meeting in order to contribute to the discussions and achieve an outcome appropriate to their requirements.

Jeff Wootton

Chair, IHO Nautical Cartography Working Group (NCWG)

12 November 2015.