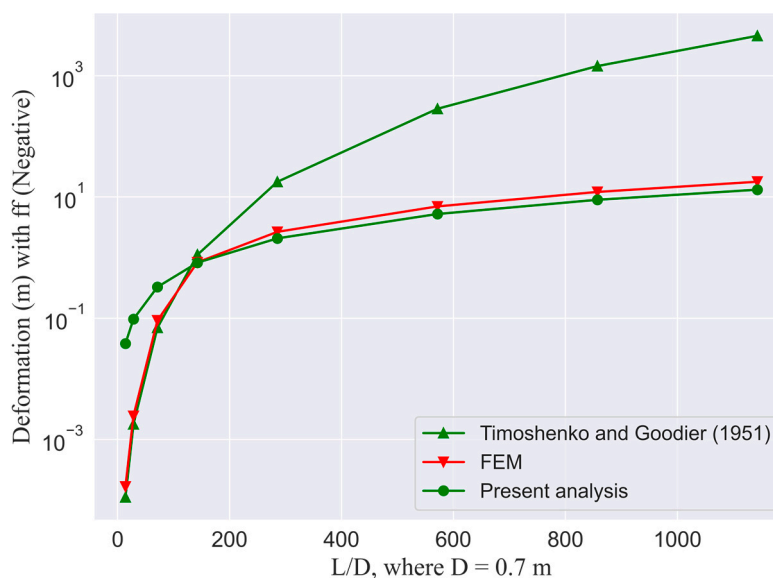*Supplementary Materials*

Figure S1. Comparisons of the static deformation of the free span submarine pipelines computed by the present analysis with the existing solutions for various $\frac{L}{D}$, where $D = 0.7$ for fixed-fixed support.
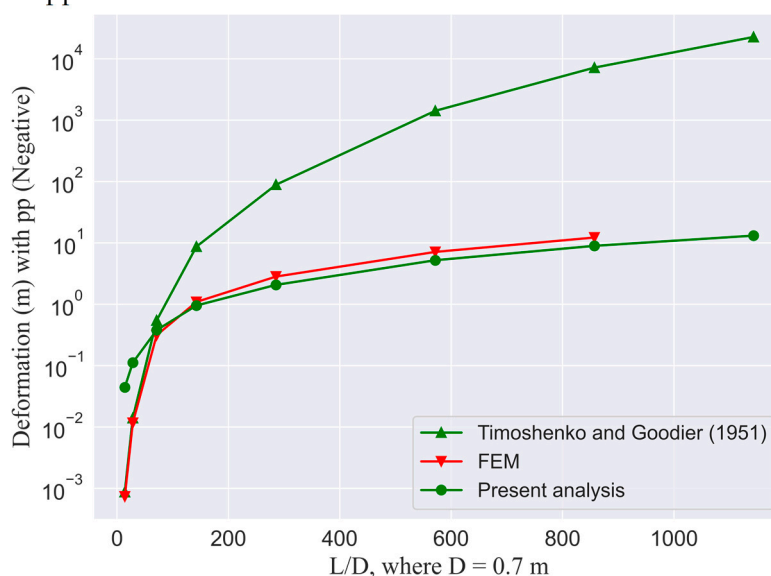

Figure S2. Comparisons of the static deformation of the free span submarine pipelines computed by the present analysis with the existing solutions for various $\frac{L}{D}$, where $D = 0.7$ for pinned-pinned support.
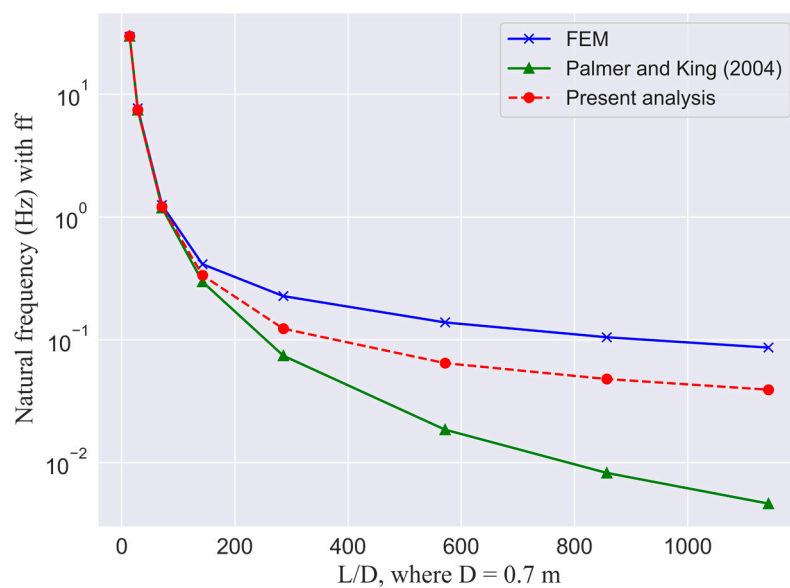
Figure S3. Comparisons of the natural frequency of the free span submarine pipelines computed by the present analysis with the existing solutions for various $\frac{L}{D}$, where $D = 0.7$ for fixed-fixed support.
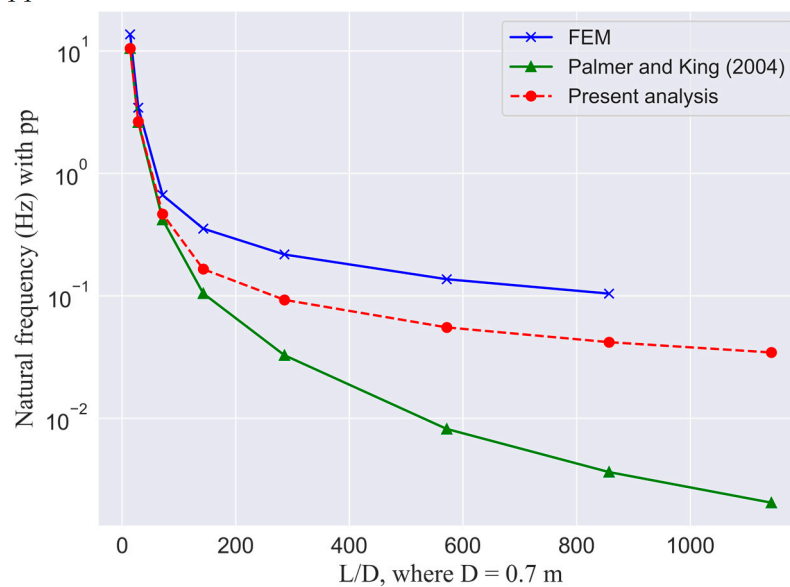

Figure S4. Comparisons of the natural frequency of the free span submarine pipelines computed by the present analysis with the existing solutions for various $\frac{L}{D}$, where $D = 0.7$ for pinned-pinned support.