

Offshore Engineering – MM575
Sheet
Span Assessment

1- The following data are obtained for an offshore gas pipeline:

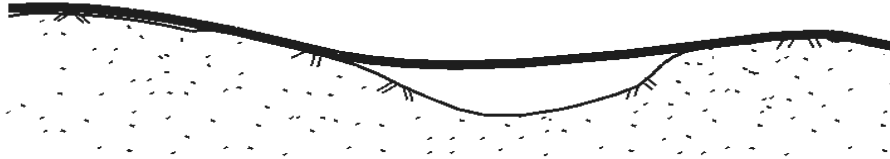


Table 1: Pipeline Data

parameter	symbol	Value
Pipeline Outside Diameter	D_o	0.3549 m
Pipe Wall Thickness	t_{nom}	0.0138 m
Steel Pipe Density	ρ_{st}	7850 Kg/m ³
Concrete Coating Thickness	t_{con}	0.055 m
Concrete Coating Density	ρ_{con}	2880 Kg/m ³
Concrete Water Absorbtion	Abs	0%
Corrosion Coating Thickness	t_{cc}	0.004 m
Corrosion Coating Density	ρ_{cc}	950 Kg/m ³
Density of Sea Water	ρ_w	1025 Kg/m ³
Density of Pipeline Content	ρ_c	60 Kg/m ³
Gravitational Acceleration	g	9.81 m/sec ²
Seabed friction coefficient	μ	0.7

Table 2: Environmental Data

Water depth d	50 m
Current speed – steady velocity	0.35 m /sec
Kinematic viscosity of sea water ν	$1.565 \times 10^{-6} \text{ m}^2/\text{sec}$
Steel Young Modulus E	$2.07 \times 10^{11} \text{ N/m}^2$
Constant for clamped-pinned ends C_e	15.4

Determine the critical span length for both inline and cross flow oscillations.

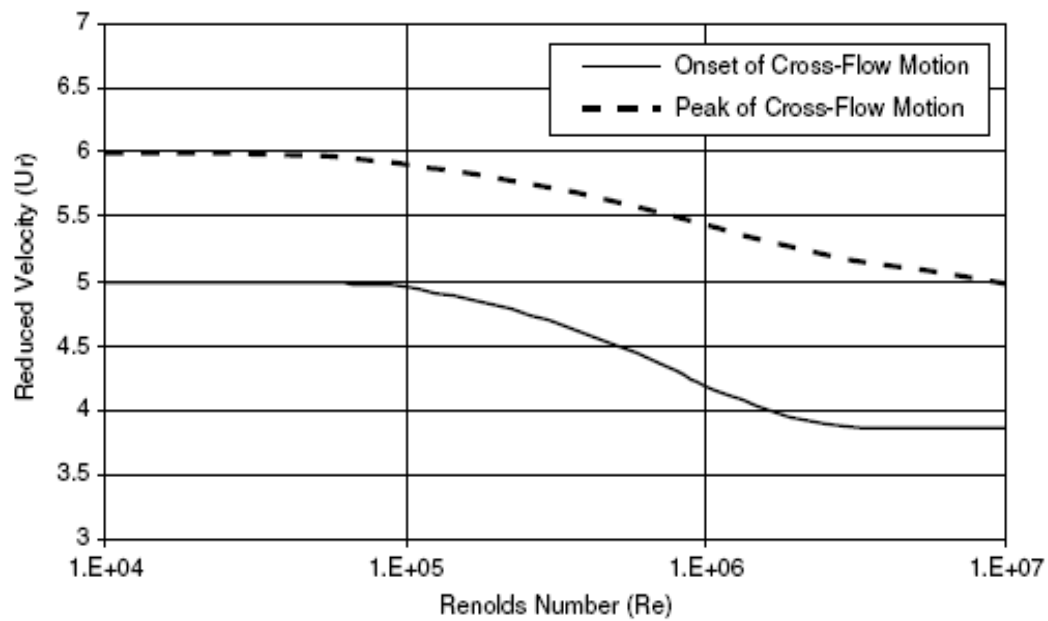


FIGURE 5.1 Reduced velocity for cross-flow oscillations based on the Reynolds Number.

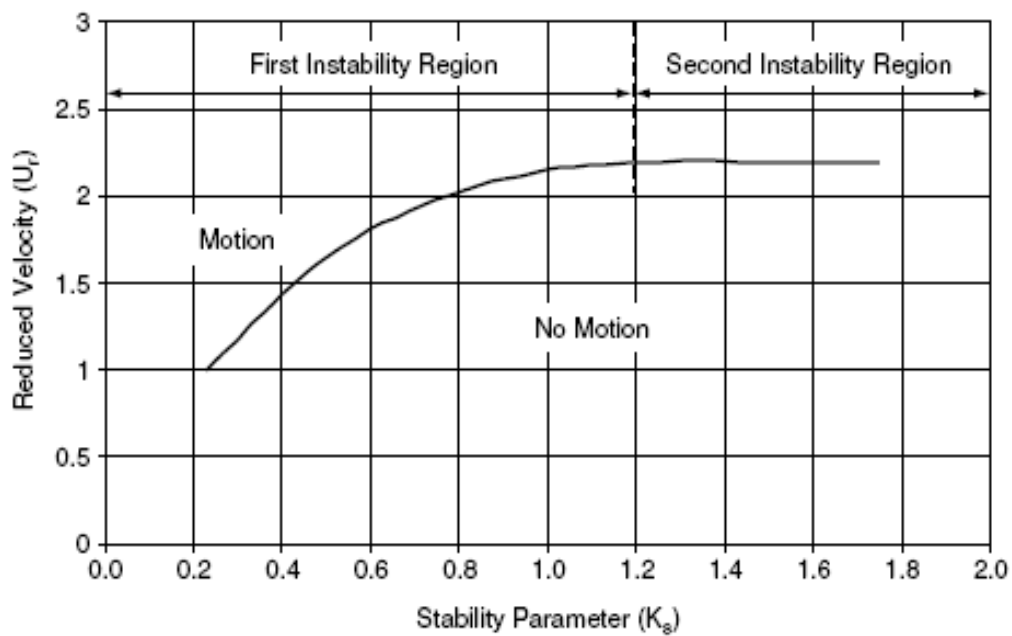


FIGURE 5.2 Reduced velocity for in-line oscillations based on the stability parameter.