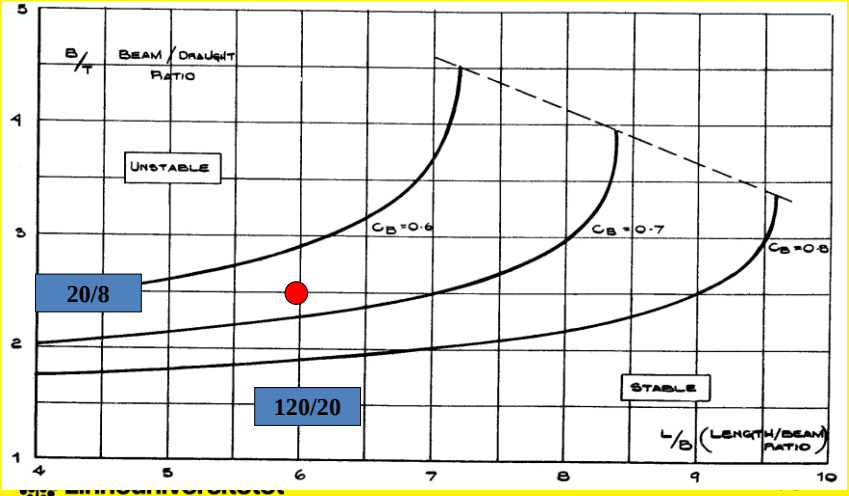
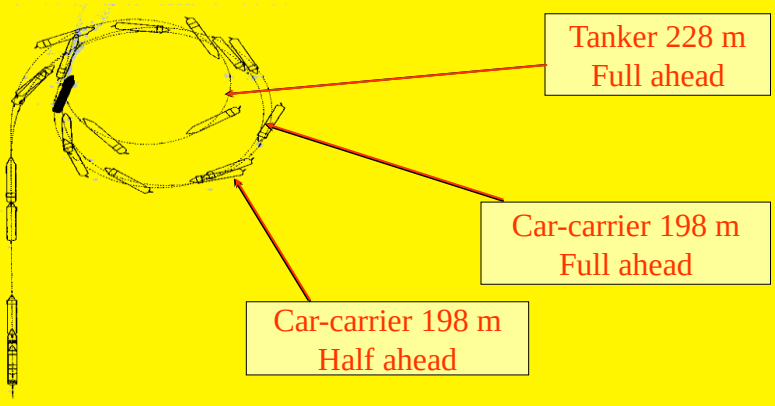
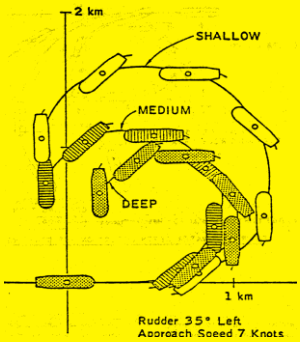
Hull parameters, influence on ship handling

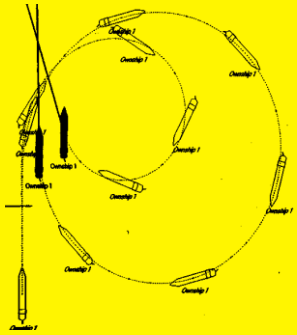


Turning with different speed and ship types



Turning on different water depth
Turning test Tanker





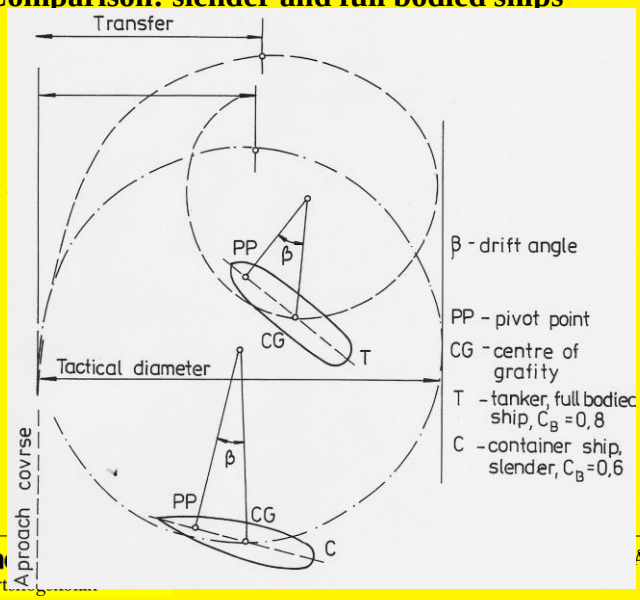
Influence of Block coefficient on turning characteristics

Containership : Cb = 0,6

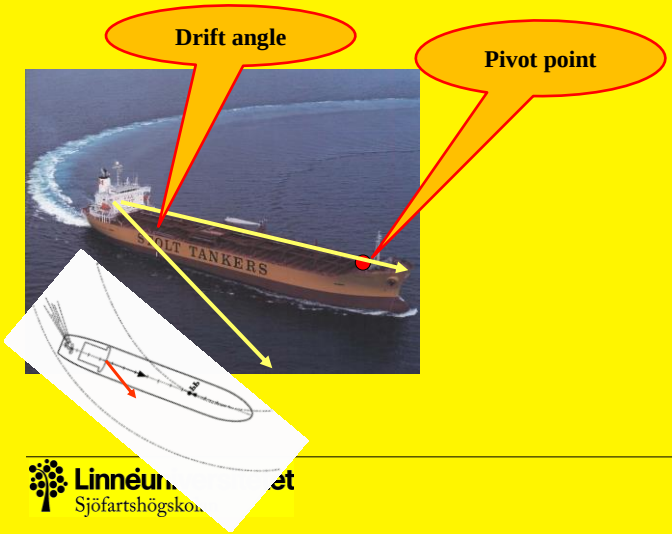
Tanker: Cb = 0,8

Turning radius of tanker much smaller
Drift angle of tanker much bigger

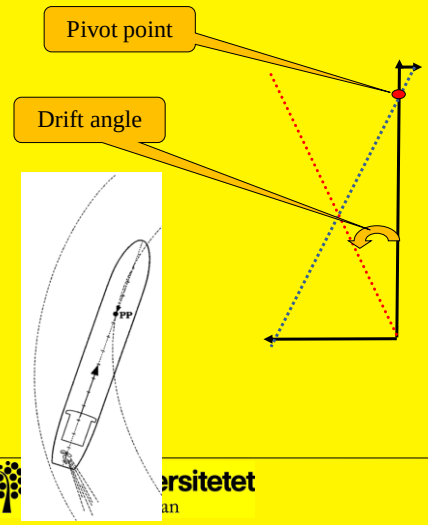
Ch2. Comparison: slender and full bodied ships



Turning test



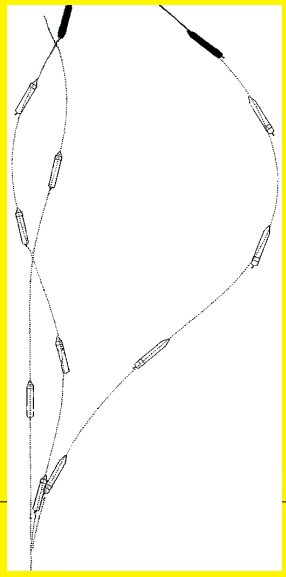
Pivot point



Tanker Full Speed
Transverse speed forward 0,1 SB
Longitudinal speed 9,0
Transverse speed aft 4,3 BB
Drift angle 25,5°
$\tan\alpha = \frac{4,3}{9,0}$ $\alpha = 25,5^{\circ}$

Course keeping stability and Yaw checking "Deep water" 2 different ships

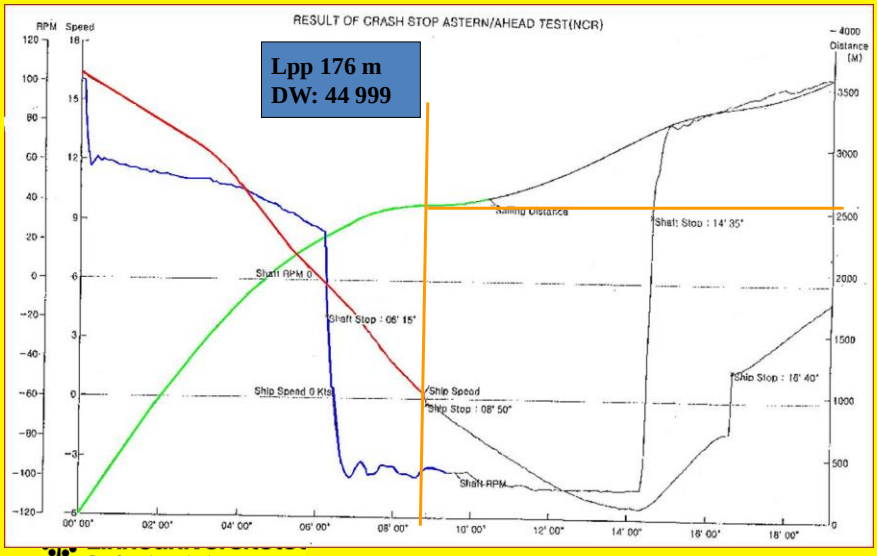
Car-carrier
Full ahead
L/V = 19.2
Max over-shoot 15º
Actual 8º



Tanker
Full ahead
L/V = 31.2
Max overshoot 20º
Actual 38º/ 60º

In shallow water:
Both vessel more
Directional stable

Bro Promotion – crash stopp



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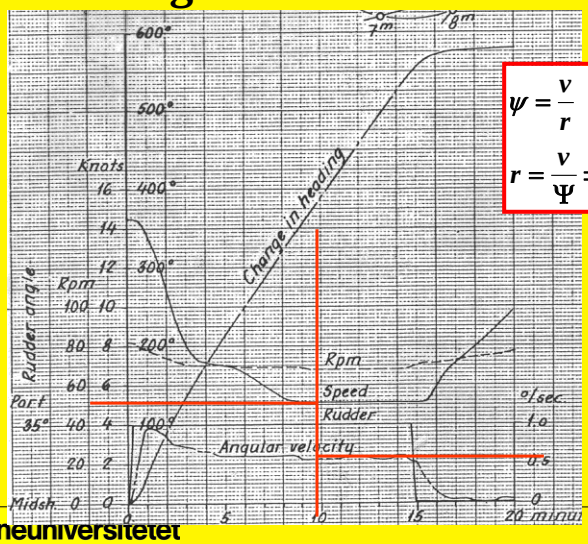
Manöverdiagram



$$\psi = \frac{v}{r}$$

$$r = \frac{v}{\Psi} \Rightarrow \frac{5}{36} = 0{,}139$$

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Bow thruster test – pivot point

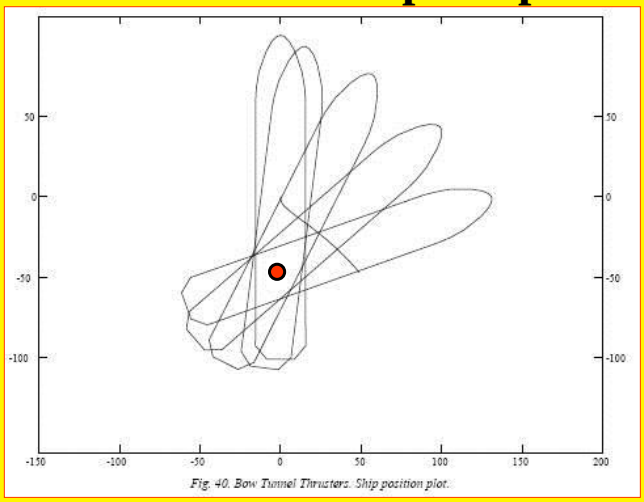
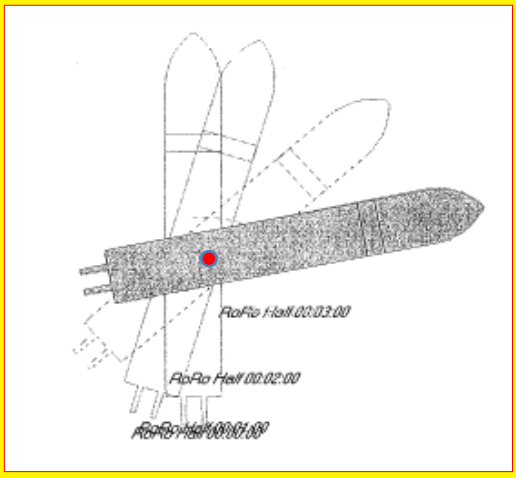
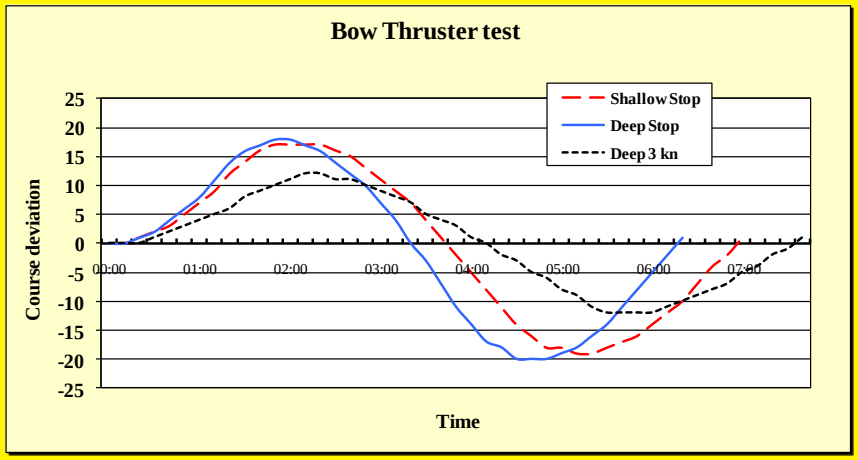


Fig. 40. Bow Tunnel Thrusters. Ship position plot.

Bow thruster test RoRo



Bow thruster effectivness



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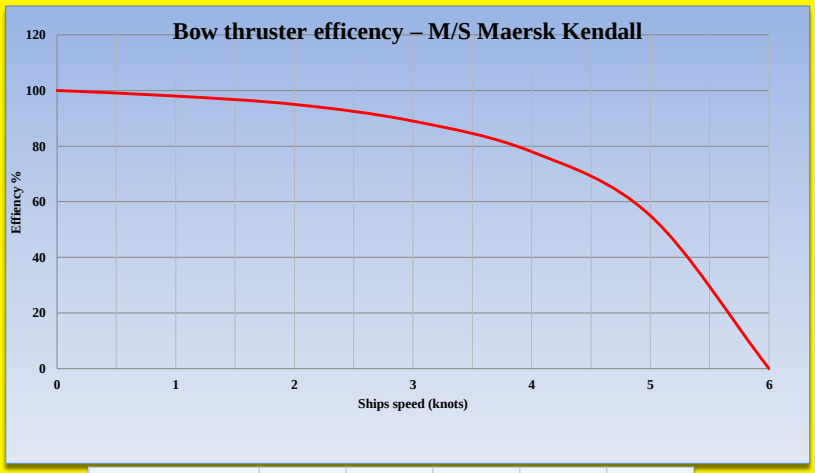

% Efficency	20	40	60	80	100
Rate of turn °/min	1,0	3,7	5,5	7,4	9,7

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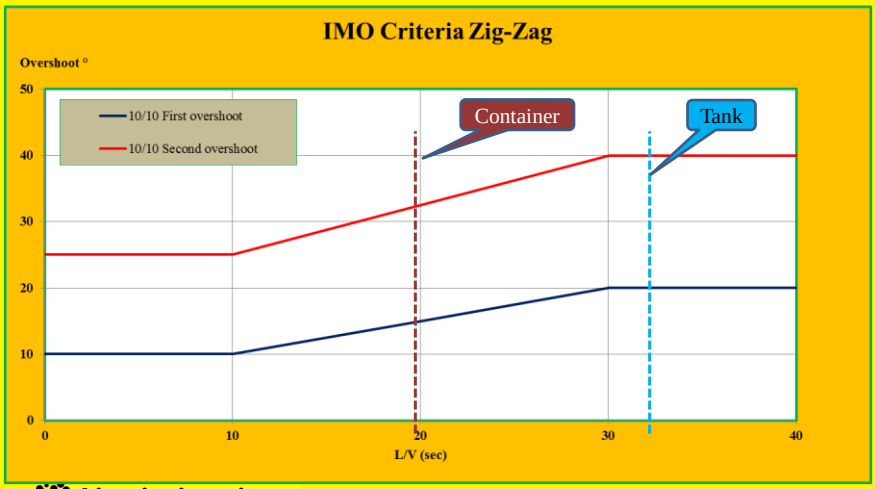
Sammanfattning -exempel

1. **Stopping ability (track reach)**
2. **Turning ability (advance 4,5 l_{pp} + tactical diameter 5 l_{pp})**
3. **Initial turning ability (2,5 l_{pp} - 10° ur kurs)**
4. **Yaw checking and course keeping ability**

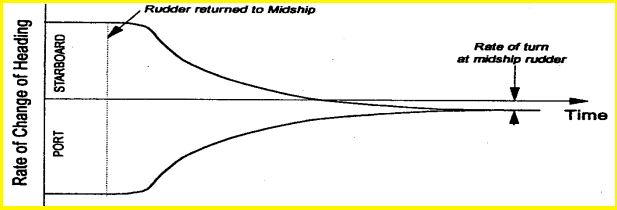
A. **Tank 250 m 15 knop (L/V = 32,4 sec)**
   1. **2.02 M**
   2. **A 0.61 M; TD 0,67M**
   3. **0,34 M**
   4. **(se fig nästa sida)**

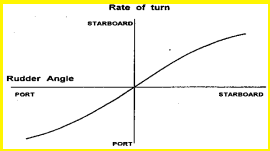
B. **Container 250 m 25 knop (L/V = 19,4 sec)**
   1. **2.02 M**
   2. **A 0.61 M; TD 0,67M**
   3. **0,34 M**
   4. **(se fig nästa sida)**

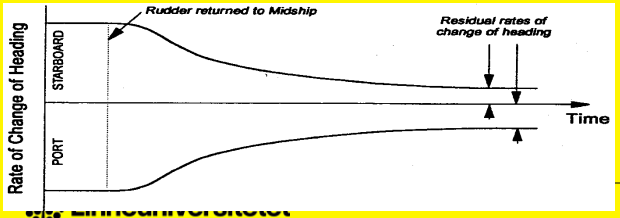
Zig-Zag 10/10



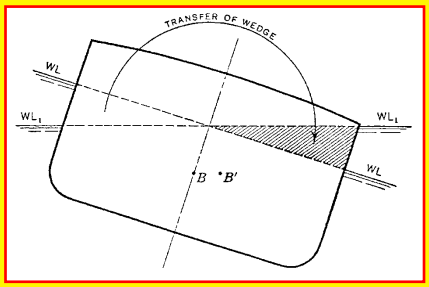
Course keeping stability, Pull out (fade out), Spiraltest







Ökat djupgående



$$T_k = \frac{B}{2} \times \sin\varphi + T \times \cos\varphi$$

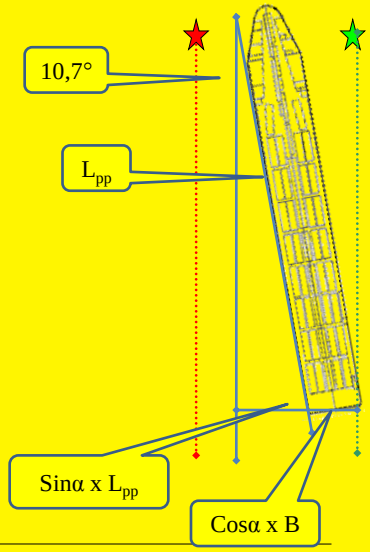
B = Bredd
T = Djupgående
φ = Krängnings vinkel

Fartygsdata:	
Lpp	200 m
B	30 m
Djupgående	ca 7 m
Vindarea	4000 m^2
Undervattenskropp area	1400 m^2
Vindhastighet	15 m/s
Fartygets hastighet	10 knop

$$V^2 \times 0{,}033 \times 1400 = \frac{0{,}52 \times 4000 \times 15^2}{10.000} \Rightarrow v = 1m/s = 1{,}9knop$$

$$\tan\alpha = \frac{1{,}9}{10} \Rightarrow \alpha = 10{,}7^\circ$$

$$TotB = Sin\alpha \times Lpp + Cos\alpha \times B$$
$$Sin10{,}7 \times 200 = 37m$$
$$Cos10{,}7 \times 30 = 29{,}5$$
$$TotB = 37 + 29{,}5 = 66{,}5$$



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Port state control

3662875	New Orleans, LA	Jan 17, 10	Vessel Inspection/PSC

System	Subsystem	Cause
Navigation	Piloting/Steering	

Description	Due Date	Resolved
1599- Navigation- During the course of the Bridge Exam, the Maneuvering Fact Sheet as per 33 CFR 157.445 could not be provided for vessel.	Jan 24, 10	Yes

Resolved Date	Resolution
Jan 21, 10	Received, reviewed, and verified, Germanischer Lloyd"s Class report attesting that the Maneuvering Fact Sheet has been provided for vessel.

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