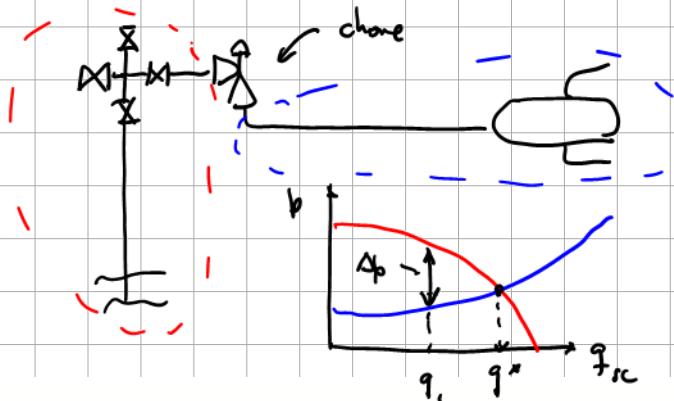
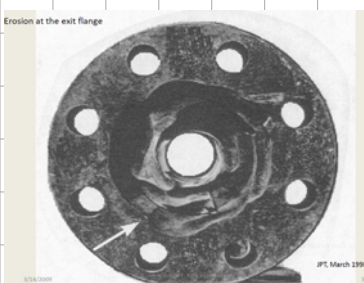
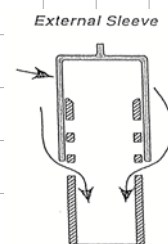
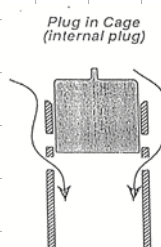
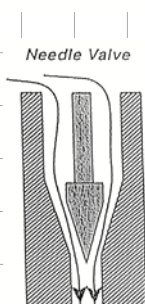
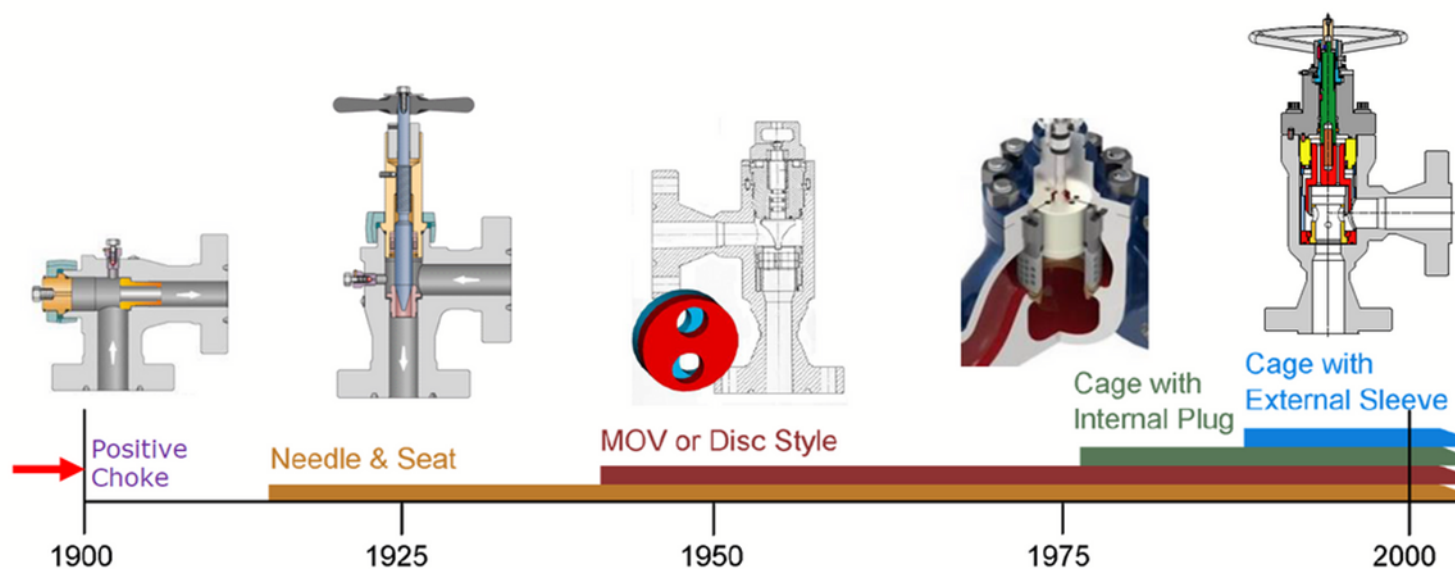


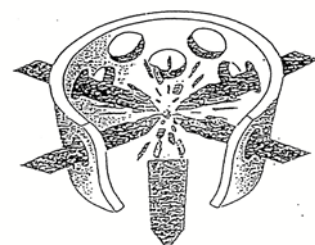
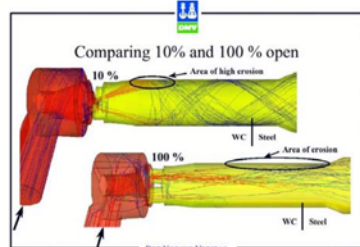
Video 17.1. - Production choke (Wellhead choke)

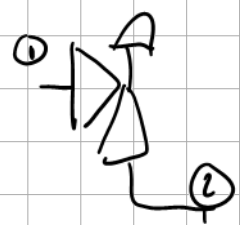
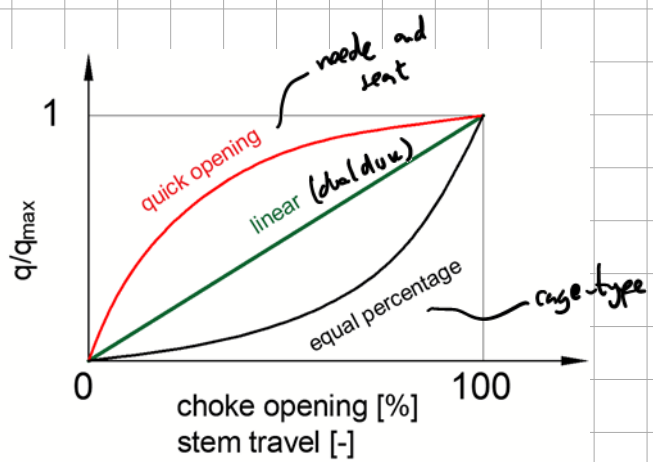
Taken from: <https://www.spegcs.org/events/6333/>

Choke Evolution



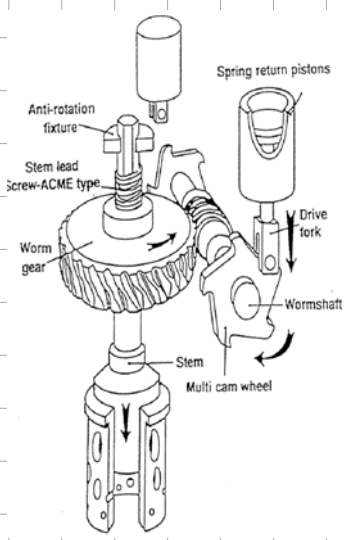
SPE94511


<https://www.oedigital.com/news/447-270-handling-sand>
<https://www.gekengineering.com/>

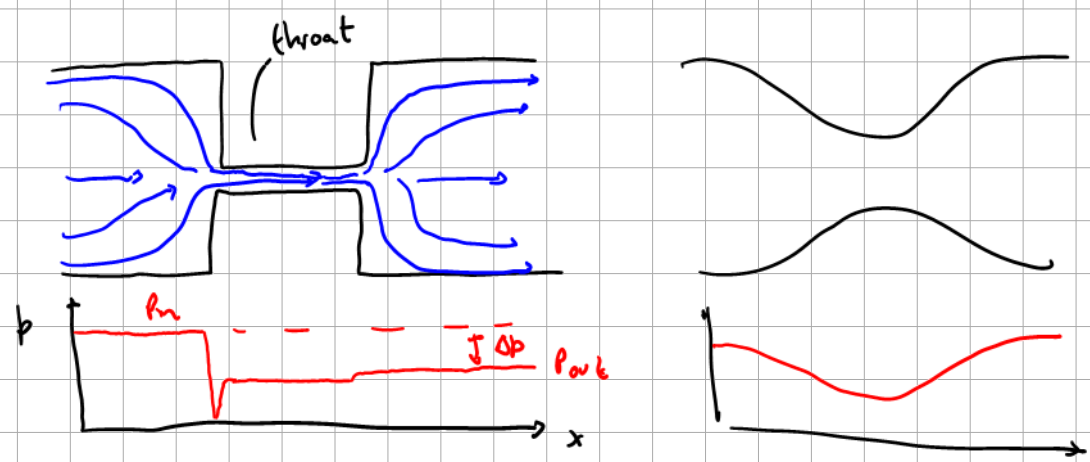


$P_1 = \text{constant}$
 $\Delta P = \text{constant}$

Actuation



Flow inside a choke

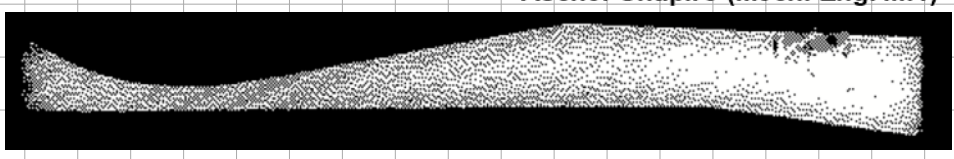


<http://web.mit.edu/hml/ncfmf.html>

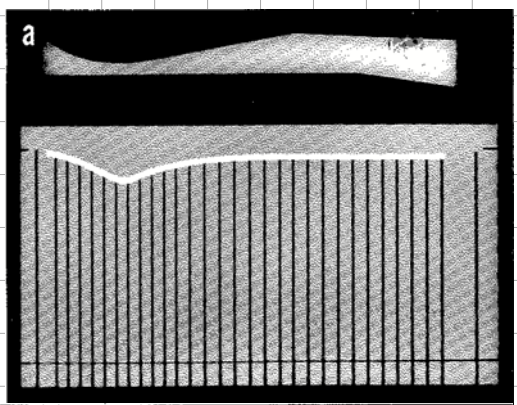
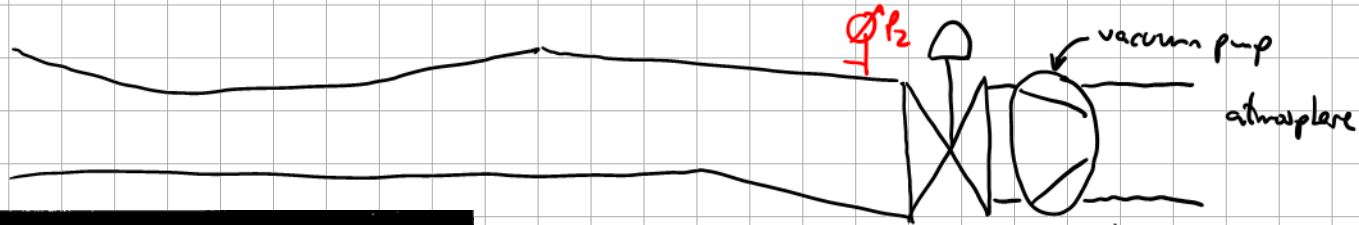


National Committee for Fluid Mechanics Films

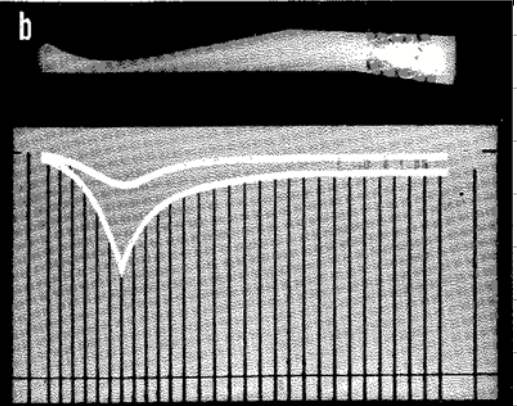
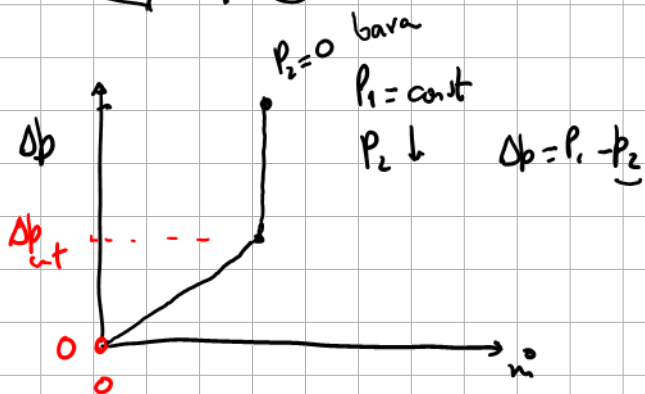
Ascher Shapiro (Mech. Eng. MIT)



atmosphere
 p_{atm}
 T_{atm}



sub-critical



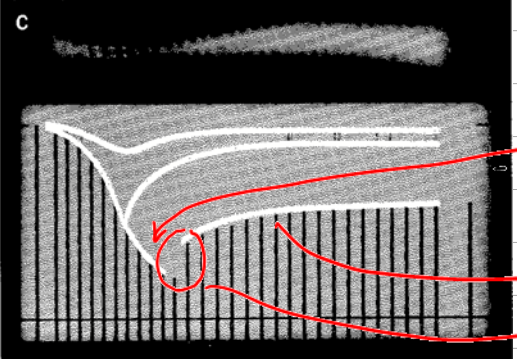
critical

a : velocity of sound in air ≈ 343 m/s

https://en.wikipedia.org/wiki/Speed_of_sound

C : velocity of sound in the fluid

Mach number $\frac{V}{C} = M$

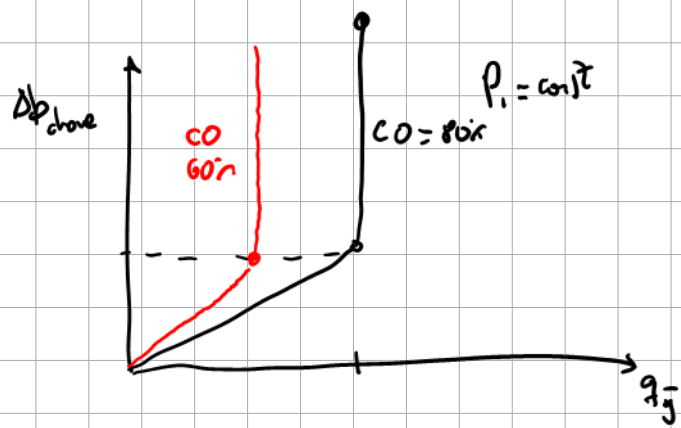


super-critical

$V > C$, supercritical ($M > 1$)

$V < C$, subcritical ($M < 1$)

"shockwave" (discontinuity)



CO : choke opening

$$\frac{p_2}{p_1} = 0.5 \quad \text{gas}$$

$$\Delta p_{crit} = p_1 - p_2 = p_1 (1 - 0.5)$$

$$\Delta p_{crit} = p_1 (0.5)$$