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Wind und Treibzeug = Mechanical impacts on natural reed stands by

wind, waves and drift

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Horizontal line in the elevation sketches: mean water level during summer time

Wavy line passing through: mean shore line during summer time

- 1 small density, single shoots, mostly 5 10/m<sup>2</sup>;
- 2 normal density, mostly about 20 60/m<sup>2</sup> (cf. HÜRLIMANN 1951);
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Algen: Concentration of cells of plankton algae in 0+10 m water depth

Crust: plankton crayfish beneath 1 dm<sup>2</sup> of water surface

Fische: total yield of fishery of the Bodensee

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 $\zeta(x,t)$  = water surface elevation T = wave period H = wave height

= water depth d

= coordinates = time x,zt

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spectum of amplitudes

aperiodic oscillation and spectrum

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weight of the drift occasionally reduced by buoyancy

 $G_T$ " weight of the drift by the sweight of the drift occase  $W_x$ ,  $W_z$  dynamic water pressure C

driving force normal force friction

Right: forces exerted on the stem by the drift.

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diameter D ----- stiffness  $E \cdot J$ 

critical moment  $M_{Gr}$  (lower line) and breaking moment  $M_{Br}$  (upper line)

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curve based on the maximum value

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F =force (e.g. weight or spring balance)

**1.6.** Diagram of load versus deflection of a reed steem. p. 343.

The graph remains qualitatively unchanged if the bending moment M or the (maximum) stress  $\sigma$  of a cross section is plotted on the vertical axis instead of the force F, also, if the deflection  $\delta$  on the horizontal axis is replaced by the strain  $\varepsilon$ .

Between point 0 and 1 load and deformation are directly proportional to each other; loading and unloading follow the same line (elastic region, no remaining deformation). If the load exceeds point 1 (e.g. at point 2), unloading follows the dashed line, i.e. a certain deformation remains, even if the load is zero (plastic deformation). If the force exceeds the breaking strength (point 3), the further part of the curve depends on the experimental layout: the dash-point line represents the case of a stem loaded by a given increasing deformation, the unbroken line holds if the load is interconnected with displacements (e.g. load by a spring balance).

- 1.7. Three possible experimental layouts for testing reed stems, with corresponding support forces, distribution of bending moment and deflections. p. 346.
  - 1. stem fixed at one end, forced at the other
  - 2. stem supported on both ends, forced between the supports (e.g. in the middle)
  - 3. stem supported on both ends, forced at two symetrically located points
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The relation load increment to deflection increment  $(dF/d\delta)$ , needed for computing the bending stiffness, is obtained as the inclination of the regression line through points 2 to 6. Because of the backlash at the beginning of the experiment (points 1 and 2), point 1 must not be used for the regression as well as the points beyond the linear-elastic region.

**1.9.** Example of a bending experiment with continually increasing load and automatic plotting of force and deflection. *p. 348*.

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F = force

D = diameter defined as representative for the tested piece

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 $M_E = h_F \cdot F$  = fixed end moment due to the force F

 $\alpha_E$  = inclination of the stem foot

 $\delta_{E}$  = displacement due to the force F

- $\delta_{\alpha}$  = displacement due to the inclination of the stem foot 5.2. Schematic view of the testing facilities for measuring the degree of fixation  $c_E$  of reed stems in the field. p. 463.
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 $G_i$ : loading weights

 $P_i$ : force exerted on the stem

 $R_i$ : friction

 $\alpha_i$ : inclination of the stem foot

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Regression lines  $\ln y = a + b \cdot \ln x$  are drawn:

---- stems from within the stand (no. 1+16)

---- stems from the front side of the stand (no. 51÷62)

## Section IV

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