[illegible] 1,2 % [illegible] 1,5% [illegible] 2%.

[illegible] 8%.) [illegible] 3 [illegible] 0,4%. [illegible]

1. [illegible] 15-20. [illegible] 2%.
2. [illegible] 3 [illegible]
3. [illegible] 30.

1. [illegible] 1991. – 6. [illegible] 30-32.
2. [illegible] 1981.- 263 [illegible]
3. [illegible] 1986.– 4.-[illegible]-16-17.

[illegible] 624.012.35.-033.32

[illegible]

[illegible]

[illegible] [1], [illegible]

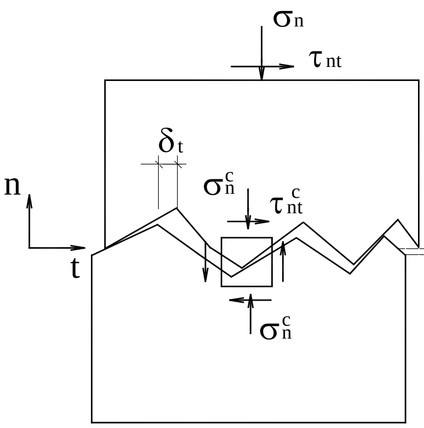
- [illegible]
- [illegible]

[illegible] [2].

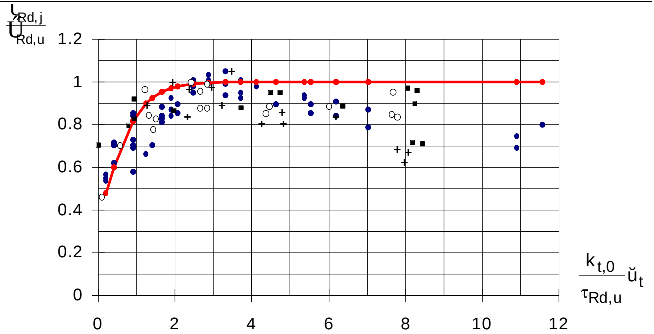
[illegible] [1] [illegible] [3, 4], [illegible]

[illegible] [5], [illegible]

[illegible], 267.



[illegible] 1. [illegible]



[illegible] 2. [illegible] $\tau_{nc,t}$ — δ_t [illegible]
- • [illegible];
- [illegible] Paulau [4] [illegible] Loeber P [9];
- [illegible] Yoshikawa [2];
- + [illegible] Reinhardt [10].

- [illegible] (Fig. 1);
- [illegible]

[illegible] $\tau_{Rd,j}$ [illegible] δ_t [illegible]

[illegible] [2 – 6 [illegible]] [illegible] [7, 8] [illegible] 0,01 [illegible]:

- [illegible]
- [illegible]

[illegible] [2], [illegible]:

$$\delta_t = \delta_t(\tau_{nt,f};\ \delta_n), \qquad (1)$$

$$\sigma_{nc} = \sigma_{nc}(\delta_n;\ \tau_{nt,c}), \qquad (2)$$

[illegible] (1) [illegible] (2) [illegible]

$$\begin{Bmatrix} d\delta_t \\ d\sigma_{nc} \end{Bmatrix} = \begin{bmatrix} 1/k_t & 1/\beta_d \\ -1/\mu_f & k_n \end{bmatrix} \begin{Bmatrix} d\tau_{nt,c} \\ d\delta_n \end{Bmatrix} \qquad (3)$$

[illegible]:

$$\begin{Bmatrix} d\delta_t \\ d\delta_n \end{Bmatrix} = \frac{1}{\xi \cdot k_t} \begin{bmatrix} 1 & (1-\xi)\mu_f \\ \beta_d & \mu_f \cdot \beta_d \end{bmatrix} \begin{Bmatrix} d\tau_{nt,c} \\ d\sigma_{nc} \end{Bmatrix} \qquad (4)$$

[illegible] $k_t = \frac{\partial \tau_{nt,c}}{\partial \delta_t}$ — [illegible]; $k_n = \frac{\partial \sigma_{nc}}{\partial \delta_n}$ — [illegible]

$\varepsilon_f = -\frac{\partial \tau_{nc,t}}{\partial \sigma_{nc,t}}$ — [illegible]; $\beta_d = \frac{\partial \sigma_n}{\partial \delta_t}$ — [illegible]

[illegible] [7], [illegible]

[illegible] ($\rho_{sw,j}$ = **0.33%**, $\rho_{sw,j}$ = **0.88%**, $\rho_{sw,j}$ = **1,33%**), [illegible] (**σ_{n}=0, σ_{n}=0.8 [illegible], σ_{n}=1.7 [illegible], σ_{n}=2.3 [illegible]**), [illegible] 5 [illegible] $\tau_{nc,t}$ — δ_t [illegible] 2.

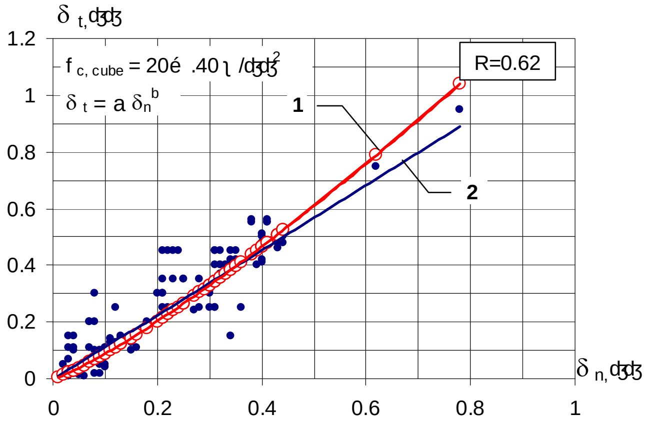
[illegible]

$$\frac{\tau_{Rd,j}}{\tau_{Rd,u}} = (1-k)\cdot \tanh\left(\frac{K_{t,0}}{\tau_{Rd,u}}\delta_t\right) + k\ , \qquad (5)$$

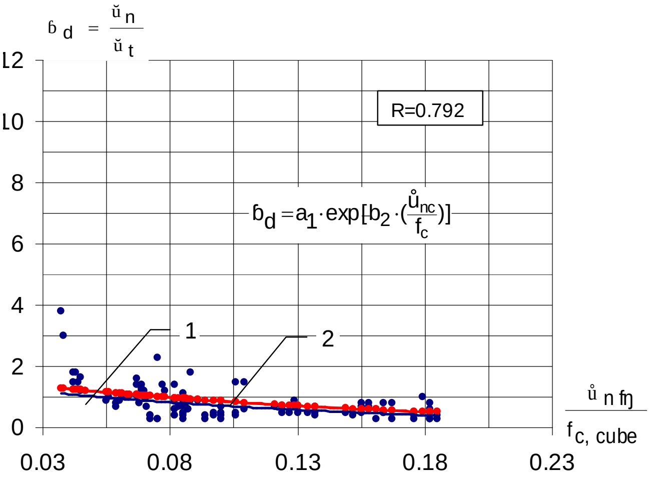
[illegible]

$$k = \tau_{Rd,0} / \tau_{Rd,u}, \qquad (6)$$

[illegible] $\tau_{Rd,j}$ – [illegible]; $\tau_{Rd,u}$ – [illegible]; $\tau_{Rd,0}$ – [illegible]; $k_{t,0}$ –



[illegible] 3. [illegible] δ_t — δ_n [illegible]
1 — [illegible] (a=1.25, b=0.99);
2 — [illegible] [5] (a=1.4, b=1.2);
1 — [illegible],
2 — [illegible] [5].



[illegible] 4. [illegible] β_d

[illegible] [2], [illegible]:

$$K_{t,0} = K_{1ST}(1 + q), \qquad (7)$$

[illegible] K_{1ST} [illegible].

[illegible] (3) [illegible]:

$$\delta_t = a\cdot\delta_n^b, \qquad (8)$$

[illegible] a [illegible] b [illegible].

[illegible] (4).

[illegible] (5) [illegible]:

$$\beta_d = a_1\cdot\exp\left[-b_1\cdot\left(\frac{\sigma_{nc}}{f_{c,cube}}\right)\right], \qquad (9)$$

[illegible] σ_{nc} [illegible]; $f_{c,cube}$ [illegible]; a_1, b_1 [illegible].

[illegible] a_1 [illegible] $\beta_{d(0)}$ [illegible] $\sigma_{nc} = 0$, [illegible] (9) [illegible]:

$$\beta_d = \beta_{d(0)}\cdot\exp\left[-9.37\cdot\left(\frac{\sigma_{nc}}{f_{c,cube}}\right)\right], \qquad (9')$$

[illegible] $\beta_{d(0)}$ [illegible] 9.37.

[illegible] [1] [illegible]:

$$\tau_{Rd,j} = k\cdot\tau_{Rd} + \mu_f\cdot\sigma_N + \rho_{sw,j}\, f_{sy}\cdot(\mu_f \sin\alpha + \cos\alpha), \qquad (10)$$

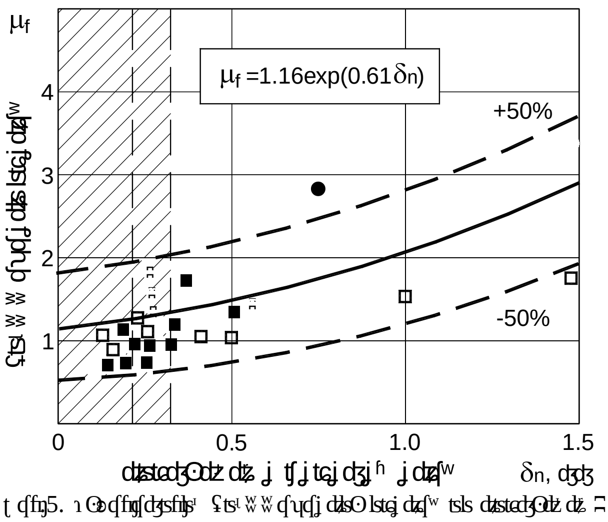
[illegible] $\alpha = 90°$ [illegible] $\rho_{sw,j}\, f_{sy}$ [illegible] $\rho_{sw,j} = 0.33$ %, [illegible] (2). [illegible].

[illegible] (5):

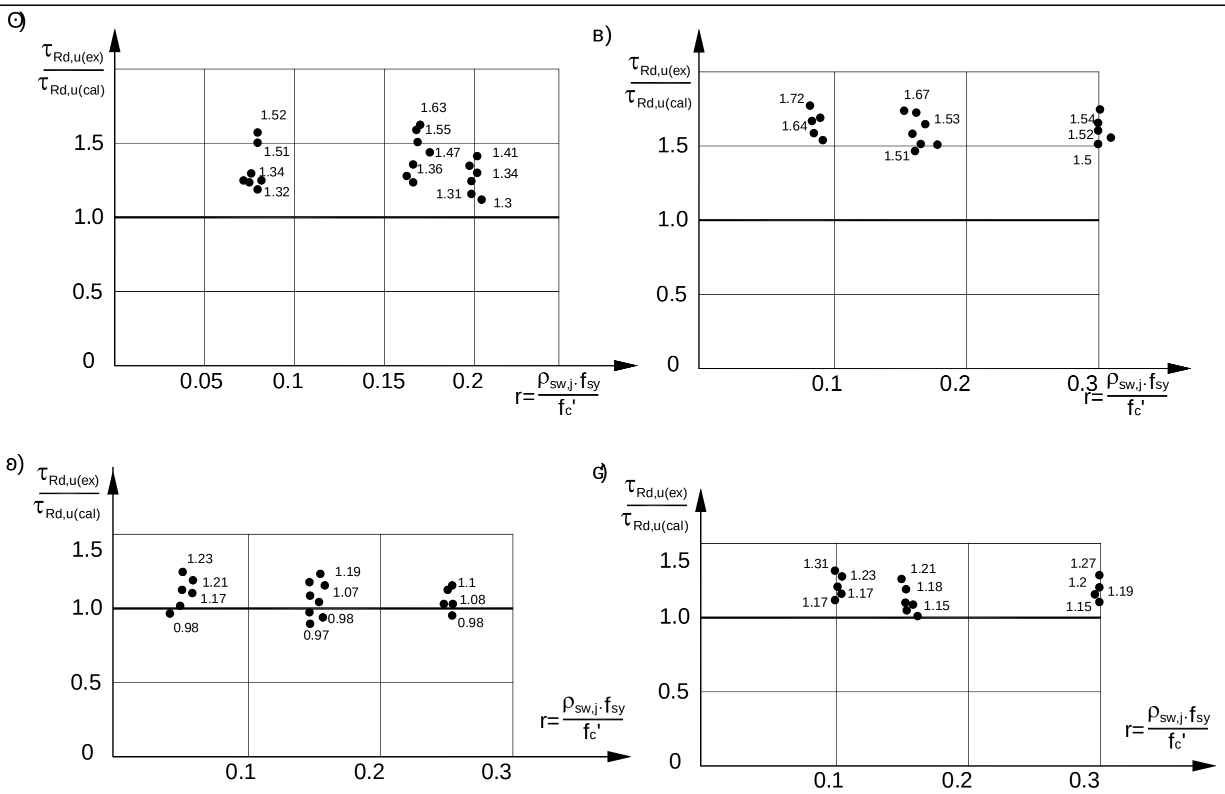
$$\varepsilon_f = a_2\cdot\exp(a_3\cdot\sigma_n), \qquad (11)$$

[illegible] δ_n [illegible]; β_d [illegible]; a_2, a_3, b_2, b_3 [illegible].

[illegible] (11) [illegible] a_2 [illegible] $\mu_{f(0)}$ [illegible] $\delta_n = 0$. [illegible]



[illegible] 5. [illegible]



6. [illegible]
(а) [illegible] [12], $\bar{\lambda}$=1.39, V_x=6.8%;
(в) [illegible] 2 [14], [illegible] 5.03.01–98 [1], $\bar{\lambda}$=1.58, V_x=4.4%;
(б) [illegible] T. Hsu [illegible] A. Mau [15], $\bar{\lambda}$=1.09, V_x=8.3%;
(г) [illegible] CSA [16], $\bar{\lambda}$=1.19, V_x=4%.

[illegible] $\mu_{f(0)} = 1.16$. [illegible] $\mu'_{f(0)}$ [illegible] $\mu_{f(0)}$. [illegible] μ_f [illegible] δ_n [illegible] $\delta_n = 0$, [illegible] $\mu_{f(0)}$. [illegible] $\mu'_{f(0)} = 0.71$.

[illegible] (11) [illegible]:

$$\varepsilon_f = \varepsilon_{f(0)} \cdot \exp(0.61 \cdot \delta_n), \qquad (11а)$$

[illegible] (11) [illegible] μ_f, [illegible] [1] [illegible] [1] [illegible] μ_f [illegible] [1], [illegible] $\mu_f = 0.7$. [illegible] (7) [illegible] $W_k = 0.3$ [illegible] $\tau_{nc,t}$ [illegible] δ_t) [illegible].

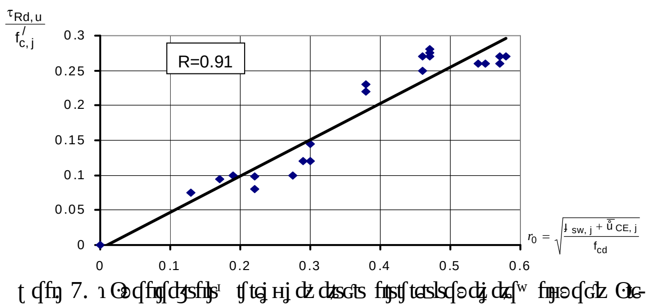
[illegible] 5.03.01, [illegible] (7).

[illegible] (6) [illegible] (10) [illegible]

[illegible] [13]. [illegible] (7), [illegible]:

$$\tau_{Rd,u} = 0.5 f_{cd} \sqrt{\frac{\rho_{sw,j} f_{yd} + \bar{\sigma}_{CE,j} + p}{f_{cd}}} \le 0.51 f_{cd}, \qquad (12)$$

[illegible] f_{cd} – [illegible] $\rho_{sw,j}$ – [illegible]; f_{yd} – [illegible]; $\sigma_{CE,j}$ – [illegible]; $p = \sigma_N$ – [illegible].



7. [illegible]

[illegible] μ_f [illegible]

[illegible]	[illegible] μ_f	
	[illegible] (w_k=0.01 [illegible])	[illegible] ($\tau_{Rd,u}$)
[illegible] [11]	—	0.63
[illegible] [12]	—	1.1
EC-2 [illegible] 5.03.01 [1]	—	0.70
[illegible] (11): [illegible] Θ_2=0.5	0.59	0.74

[illegible]

1. [illegible]
2. [illegible]
3. [illegible] 5.03.01. [illegible] (272) [illegible] 5.03.01. [illegible] (272), [illegible] (12), [illegible]

[illegible]

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