



$\dot{\epsilon}_{_{11}}$ $\dot{\epsilon}_{_{31}}$			$\dot{\epsilon}_{q} = \left(\frac{1}{G}\right)$	$\frac{1}{G} + \frac{1}{K_p} \dot{q} - \frac{\eta}{K_p}$	ġ	()
σ ₃₃			$\dot{\epsilon}_v = \frac{\dot{p}}{K}$	$+ d \dot{\epsilon}_{q}^{p}$. ,
. (Λ)		Li & Dafalia	IS	
		(-)			:[]	
[] Lade			$d = \frac{d_0}{M} ($	$\left(\eta_{pt}-\eta\right)$		()
C					$\eta_{pt} = M exp$	(mψ)
•	$\Delta \dot{\mathbf{\epsilon}} = \mathbf{C} \Delta \mathbf{c}$	ō	$K_p = (1$	$h_1 - h_2 e)G\left(\frac{N}{r}\right)$	$\left(\frac{1}{1} - \exp(n\psi)\right)$	()
$\begin{cases} \Delta \dot{\varepsilon}_{33} = 0 \\ \Delta \dot{\varepsilon}_{22} = 0 \end{cases} = \begin{pmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{pmatrix}$	$ \sum_{2} \left\{ \Delta \dot{\sigma}_{33} \neq 0 \right\} $ $ \left\{ \Delta \dot{\sigma}_{22} \neq 0 \right\} $	()		М	m, m, h_2, h_1 M.	
	det C =		03	() ()	
$C_{11}C_{22} - C_{12}C_{21} = 0$. شيرط نايايداري.	11ne1
به مدل رفتاری پیشنهادی	ختصاصی با توجه ب	شرايط ا.			ا سر ت تپ ید ری	
$\dot{\varepsilon}_{22}^{e} = \frac{\dot{\sigma}_{22}}{E} - \frac{\nu}{E} (\dot{\sigma}_{11} + \dot{\sigma}_{33})$ $\dot{\varepsilon}_{33}^{e} = \frac{\dot{\sigma}_{33}}{E} - \frac{\nu}{E} (\dot{\sigma}_{11} + \dot{\sigma}_{22})$:)	()		·	عمومى	شرط
	$E\left(=2(1+\nu)G\right)$					
:			-)	θ		(
$\Delta \dot{\varepsilon}_{22}^{e} = \frac{\Delta \dot{\sigma}_{22}}{E} - \frac{\nu}{E} (\Delta \dot{\sigma}_{11} + \Delta \dot{\varepsilon}_{33}^{e}) = \frac{\Delta \dot{\sigma}_{33}}{E} - \frac{\nu}{E} (\Delta \dot{\sigma}_{11} + \Delta \dot$	+Δσ៎ ₃₃) +Δσ៎ ₂₂)	()				

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$$\begin{split} \partial f / \partial \sigma_{22} - \partial g / \partial \sigma_{22} - 0 & & & \\ \partial \dot{a}_{33}^{L} = \frac{1}{K_{p}} \cdot \frac{\partial f}{\partial \sigma_{33}} \cdot \frac{\partial g}{\partial \sigma_{33}} \Delta \dot{\sigma}_{33} & & (--) \\ & \dot{a}_{33}^{L} = \frac{1}{K_{p}} \cdot \frac{\partial f}{\partial \sigma_{33}} \cdot \frac{\partial g}{\partial \sigma_{33}} \Delta \dot{\sigma}_{33} & & (--) \\ & & & & \\ (\lambda_{23}^{L})_{2} = \begin{pmatrix} I/E & -v/E & -v/E \\ -v/E & I/E + I/K_{p} \frac{\partial f}{\partial \sigma_{13}} \cdot \frac{\partial g}{\partial \sigma_{33}} & & (-) \\ & & & \\ (-) & & \\$$

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شکل ۴: مقایسه نتایج پیش بینی مدل با داده های تجربی برای شیب نوار برشی با صفحه تنش اصلی بیشینه (داده های تجربی برگرفته از مرجع [۹]).

Confining Stress, σ₃ (kPa)

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شکل ۵: مقایسه پیش بینی های مدل با داده های تجربی برای کرانهای بالا و پایین کرنش محوری که در آن ناپایداری رخ می دهد با استفاده از مدل تابع حالت خاک (داده های تجربی برگرفته از مرجع [۹]).



شکل ۶: مقایسه پیش بینی های مدل با داده های تجربی برای کران پایین کرنش محوری که در آن ناپایداری رخ می دهد با استفاده از مدل مستقل از حالت خاک (داده های تجربی برگرفته از مرجع [۹]).



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