

# An Initial Equilibrium State Analysis of Cable-Stayed Bridges by Minimizing Moment of Structures

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Kim, Chang Hyun · Lee, Hae Sung

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( , 1999)

(Kim & Lee, 2001)

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가  $L_0$

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$$\begin{aligned}
 x(s) &= -\frac{F_1}{EA} s - \frac{F_1}{w} \left\{ \sinh^{-1} \left( \frac{F_3}{H} \right) - \sinh^{-1} \left( \frac{F_3 - ws}{H} \right) \right\} \\
 y(s) &= \frac{F_2}{EA} s - \frac{F_2}{w} \left\{ \sinh^{-1} \left( \frac{F_3}{H} \right) - \sinh^{-1} \left( \frac{F_3 - ws}{H} \right) \right\} \quad (1)
 \end{aligned}$$

$$z(s) = -\frac{F_3}{EA} s - \frac{F_1}{2EA} - \frac{H}{w} \left[ \left\{ 1 + \left( \frac{F_3}{H} \right)^{1/2} \right\} - \left\{ 1 + \left( \frac{F_3 - ws}{H} \right)^2 \right\}^{1/2} \right]$$

,  $s$  Lagrangian ,  $H = \sqrt{F_1^2 + F_2^2}$  ,  $F_1, F_2, F_3$   
 .  $EA$  ,  $w$  . (  $s = L_0$  )

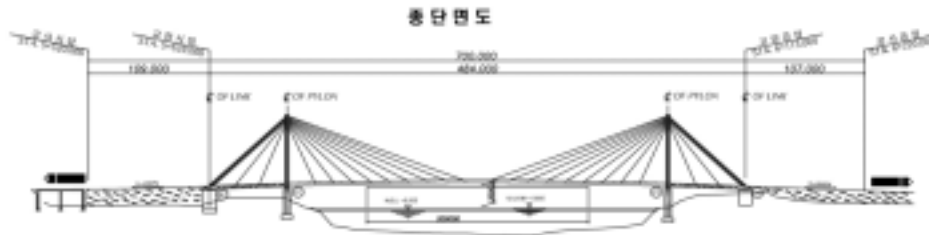
$$l_x = f(F_1, F_2, F_3, L_0) \quad l_y = g(F_1, F_2, F_3, L_0) \quad l_z = h(F_1, F_2, F_3, L_0) \quad (2)$$

(2) (3) .[2]

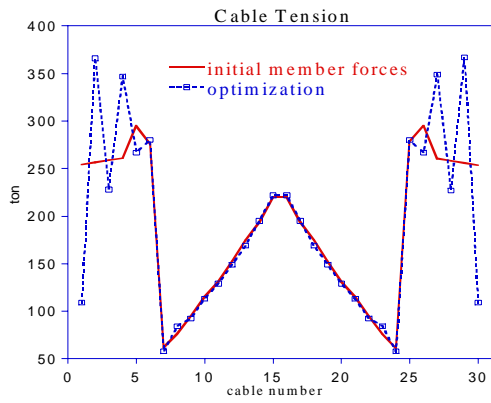
$$\Delta \mathbf{F}_c^e = \mathbf{K}_c^e \Delta \mathbf{x}^e + \mathbf{K}_g^e \Delta L_0^e \quad (3)$$

$$\Delta \mathbf{F}_c^e = (\Delta \mathbf{F}_1^e, \Delta \mathbf{F}_2^e), \quad \Delta \mathbf{x}^e = (\Delta \mathbf{x}_1^e, \Delta \mathbf{x}_2^e), \quad \mathbf{K}_c^e = \begin{bmatrix} -\mathbf{k}_c & \mathbf{k}_c \\ \mathbf{k}_c & -\mathbf{k}_c \end{bmatrix}, \quad \mathbf{K}_g^e = \begin{pmatrix} \mathbf{k}_g \\ -\mathbf{k}_g - \mathbf{w} \end{pmatrix}$$

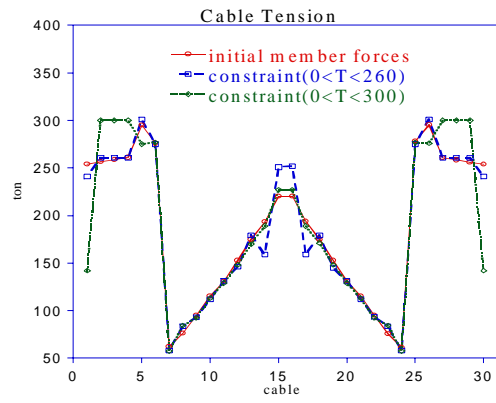




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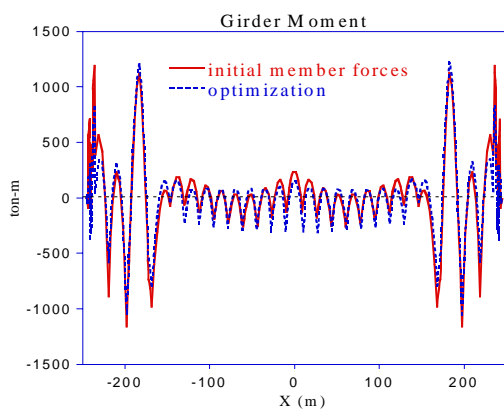


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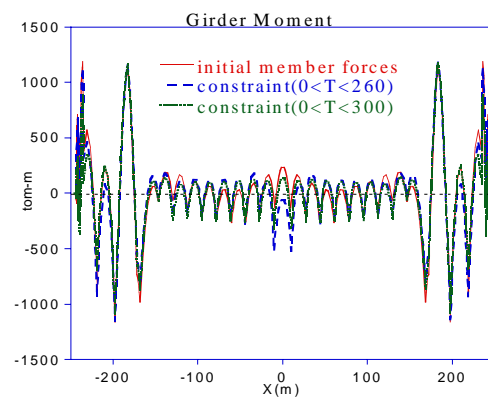


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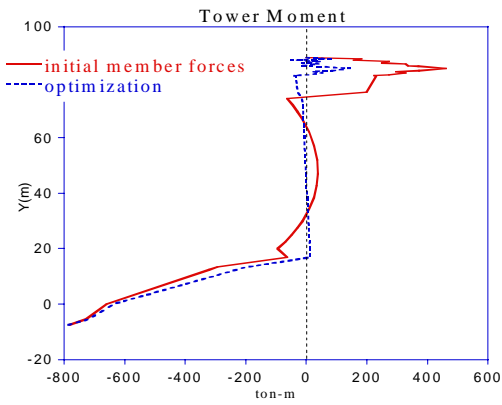


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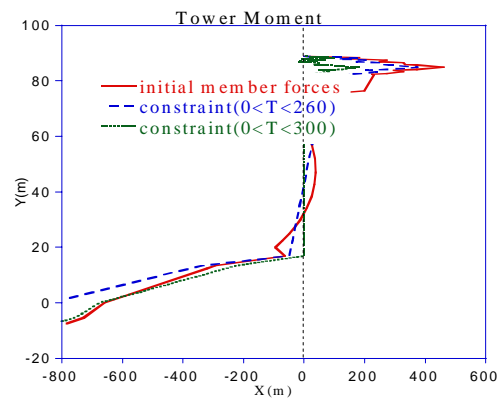
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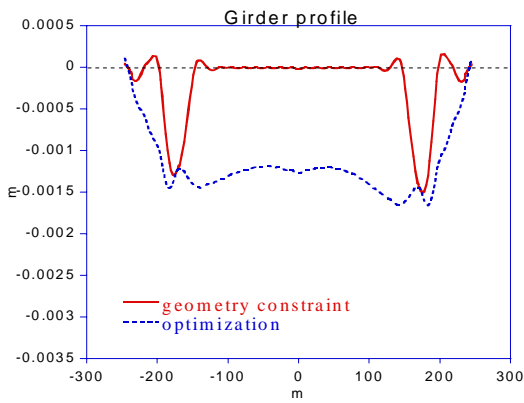
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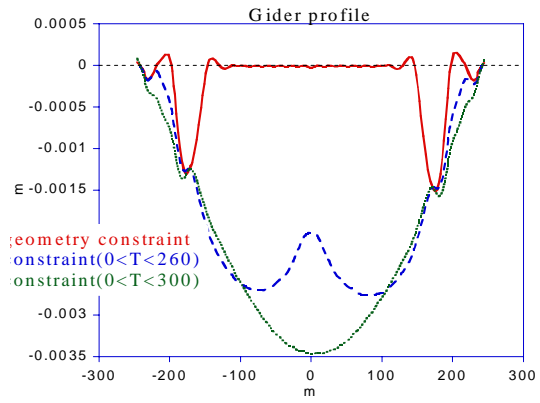
7.

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8.

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9.

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|  |         |           | Constraint<br>(0 < T < 260) | Constraint<br>(0 < T < 300) |
|--|---------|-----------|-----------------------------|-----------------------------|
|  | 100 (%) | 48.83 (%) | 65.78 (%)                   | 50.88 (%)                   |

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4 6

back-stayed

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가

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300 ton

가

[ 5,7]가

가 . 가 back-stayed  
 back-stayed 0<T<260 ton [ 3],  
 가 .

5.

back-stayed 가  
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1. , (1999),
2. Kim, K.S and Lee, H.S., (2001) Analysis of target configurations under dead loads for cable-supported bridges, *Journal of Computers and Structures*, Vol. 79, Issue 29-30, pp. 2681-2692
3. , (1998) ,
4. . , (2002) , Regularization Techniques in System Identification for Damage Assessment of Structures ,