

1 **PERFORMANCE ASSESSMENT OF REFRACTORY CONCRETE USED ON THE**
2 **SPACE SHUTTLE'S LAUNCH PAD**

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6 **Biography:** ACI member David Trejo is an Associate Professor in the Department of Civil
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13 Dr. Luz Marina Calle is a senior research scientist at NASA/Kennedy Space Center where she
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22 developing statistical-based models for predicting the performance of constructed systems.

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24 **ABSTRACT**

25 The John F. Kennedy Space Center (KSC) maintains several facilities for launching
26 space vehicles. During recent launches it has been observed that the refractory concrete
27 materials that protect the steel-framed flame duct are breaking away from this base structure and
28 are being projected at high velocities. There is significant concern that these projected pieces
29 can strike the launch complex or space vehicle during the launch, jeopardizing the safety of the
30 mission. A qualification program is in place to evaluate the performance of different refractory
31 concretes and data from these tests have been used to assess the performance of the refractory
32 concretes. However, there is significant variation in the test results, possibly making the existing
33 qualification test program unreliable. This paper will evaluate data from past qualification tests,
34 identify potential key performance indicators for the launch complex, and will recommend a new
35 qualification test program that can be used to better qualify refractory concrete.

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38 **Key words:** refractory concrete, performance, coefficient of thermal expansion, shrinkage,
39 modulus of rupture, abrasion/erosion.