

Containment

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# RE-EVALUATION OF CONTAINMENT LINER FOR HOSGRI SEISMIC LOADS

1-3-78

BASIC ASSUMPTION IN THE HOSGRI RE-EVALUATION OF THE LINER IS THAT IT IS NOT A STRUCTURAL ELEMENT. FOR THIS REASON, THE OBJECTIVE OF OUR EVALUATION IS TO DETERMINE:

- ① THE EFFECT: LINER MAY HAVE ON STRUCTURAL ELEMENTS' (REINFORCING) ABILITY TO RESIST SEISMIC FORCES.
- ② THE EFFECT STRUCTURAL ELEMENTS HAVE ON THE LINER FUNCTION UNDER SEISMIC LOADING.

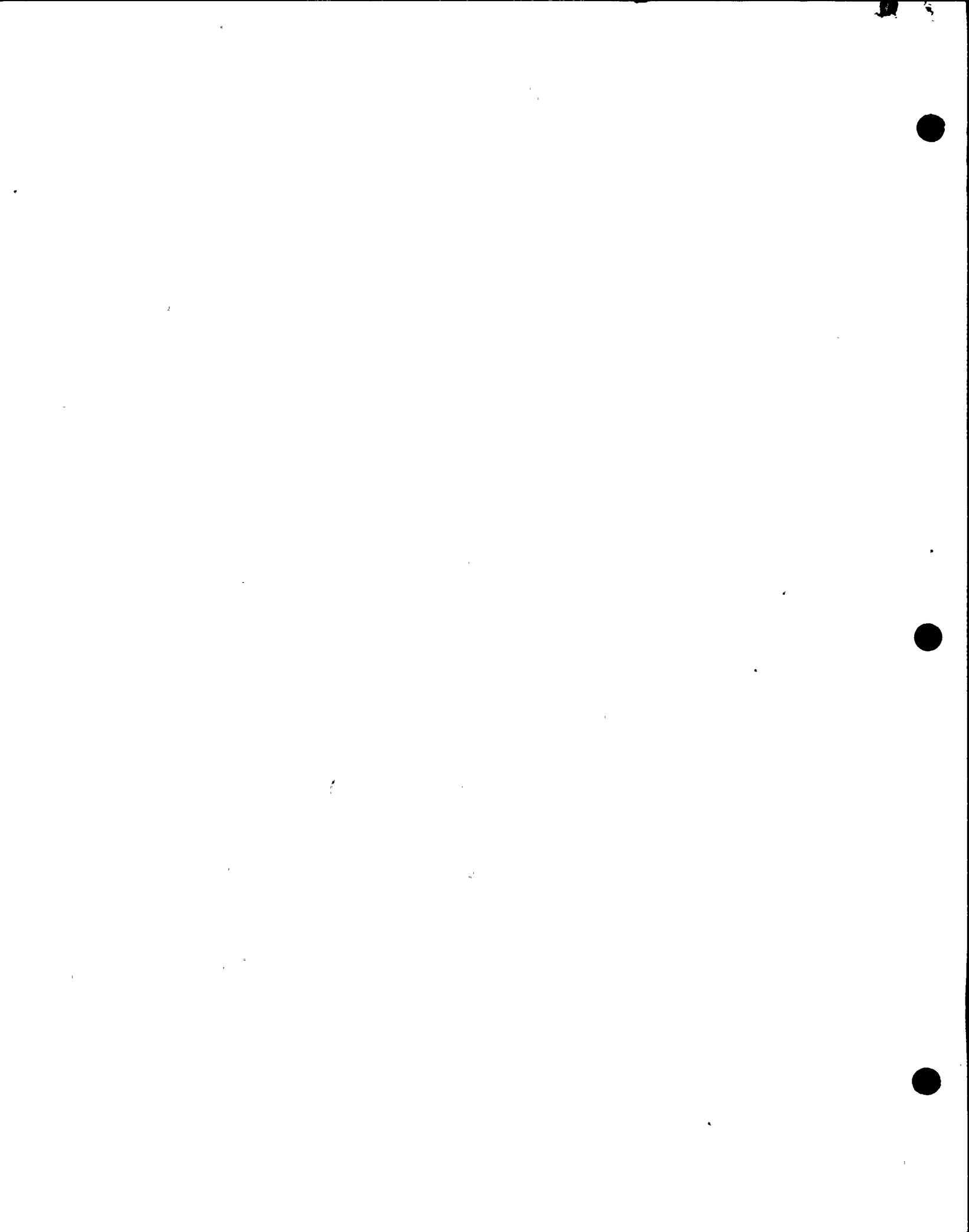
THE CONTAINMENT SHELL MAY ACT EITHER AS: CRACKED OR UNCRACKED SECTION DEPENDING ON LOADING CONDITIONS.

IN EVALUATING EFFECT ①, CRACKED SECTION IS ASSUMED. THERMAL EXPANSION OF THE LINER WILL THEN HAVE MAXIMUM IMPACT ON REINFORCING STRESSES.

IN EVALUATING EFFECT ②, CRACKED SECTION IS ASSUMED IN CALCULATIONS OF THE MAXIMUM TENSILE OR SHEAR STRESSES IN THE LINER. MAXIMUM COMPRESSION HOWEVER, WILL OCCUR IN UNCRACKED CONDITION, SINCE CRACKING RELIEVES THERMAL STRESSES

## RESULTS

1. CRACKED SECTION STRESSES WERE CALCULATED FOR HOSGRI LOADS USING "STRAN" PROGRAM. THESE RESULTS PERMIT US TO EVALUATE EFFECT ① AND THE MAXIMUM TENSILE



## STRESSES IN THE LINER.

THE RESULTS SHOW THE FOLLOWING MAXIMUM TENSILE STRESS STRESSES:

$$\sigma_x = 4.3 \text{ KSI}$$

$$\sigma_y = 5.5 \text{ KSI}$$

$$\tau_{xy} = 14.1 \text{ KSI}$$

THESE RESULTS ALSO SHOW THAT AT CONTROLLING SECTIONS AT EL. 89 AND 166 LINER IS SUBJECT TO TENSION.

THIS MEANS THE LINGS DOES NOT IMPOSE ADDITIONAL THERMAL LOAD ON REINFORCING AT THESE SECTIONS.

2. FOR THE UNCRACKED SECTION, THE STIFFNESS OF CONCRETE AND REINFORCING REPRESENTS 95% OF THE TOTAL AXIAL LOAD STIFFNESS AND 91% OF THE TOTAL SHEAR STIFFNESS. THE MAXIMUM COMPRESSIVE & SHEAR STRESSES IN THE LINER FOR UNCRACKED CONDITIONS WILL BE:

	<u>D+P+T</u>	<u>DDE</u>	<u>HOSGRI</u>	<u>D+P+T+DDE</u>	<u>D+P+T+HOSGRI</u>
$\sigma_x$	-45.28	-1.23	-1.15	-46.51	-46.43 (-0.2%)
$\sigma_y$	-44.00	-4.13	-4.63	-48.13	-48.63 (+1%)
$\tau_{xy}$	-	4.41	4.44	4.41	4.44 (+1%)

THE TOTAL SEISMIC CONTRIBUTION TO THE MAXIMUM COMPRESSIVE STRESS IS LESS THAN 10%.

MAXIMUM COMPRESSIVE STRESS INCLUDING HOSGRI LOADS EXCEED BY 1% SIMILAR STRESS UNDER DDE CONDITION, AND IS 21% LESS THAN FOR FACTORED LOAD  $1.5P+T$

