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TA 439 Avery

TEXAS HIGHWAY DEPARTMENT
Maintenance Operations Division
Austin, Texas 78701
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Introduction

General Deck Condition classifications as listed on the survey form are outlined herein and illustrated with example photographs. This illustrated outline is presented as an aid, to the individual or team assigned to survey bridge decks, in correctly classifying the decks surveyed to provide uniform data so important to accurate and dependable analysis.

The wide range of possible deck conditions are separated into twelve major classifications. This large number of classifications was chosen to facilitate accurate interpretation of deck condition and to reduce borderline decisions as much as possible.

There is a definite range within each classification as will be noted in the photograph section. Only a limited number of photographs were available for selection. The best of these were chosen; however, there may be some deck conditions which will not be adequately covered by these photographs. In this case, the photographs may be used as a relative guide.

In all instances, the written classifications govern. The photographs are provided to support the classifications and to assist in classification interpretation.

Of the several types of deterioration, only delamination cannot be determined by visual means. It is possible for a deck
to appear perfectly sound, with little or no surface deterioration, and yet be delaminated or separated in a layer beneath
the surface. The best current means of detecting delamination
is by tapping or dragging a light metal object, such as a small
hammer, on the deck surface. A marked difference or variation
in the resulting sound denotes separated areas. High frequency,
platy sounds indicate very thin separations.

Since various types and degrees of deterioration may appear on a single structure, the survey form is designed for entry of the numerical classification data by pours.

Any unusual condition which cannot be adequately covered or described by numerical classification should be entered by note

in spaces provided on the survey form. An example of such an entry is when a pour may show several classifications of deterioration. When a single pour presents several classifications, record the most serious classification numerically and indicate in note form the various other conditions which exist.

Curb, walk and sidewall or parapet deterioration should be entered in note form. Existance, type and condition of overlays, patches and other repairs should also be noted.

Leaking cracks which pass water completely through the deck can usually be identified by a white or grey efflorescence or powder deposit along the edges of the crack on the underside of the deck.

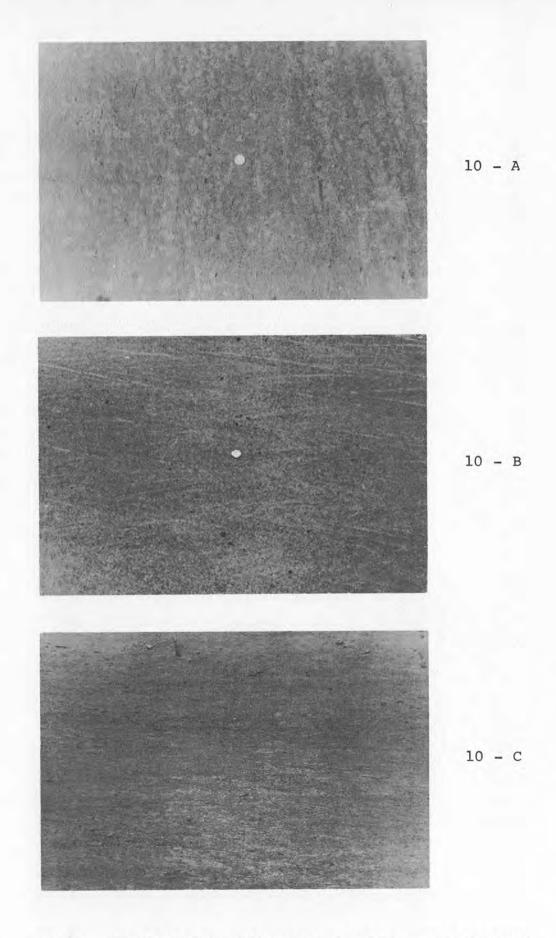
When tension cracking is discovered on the underside of a deck, the cracks should be carefully observed under automobile and truck traffic to determine if the cracks are working and to what degree. Working tension cracks should be recorded by note.

Damage caused by fire, accident, chemical spillage, storm, etc., should be noted.

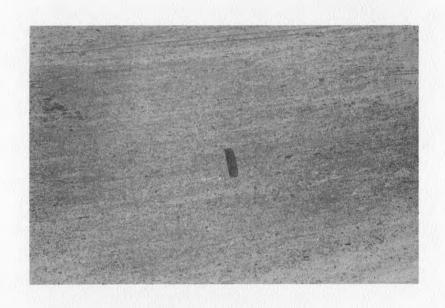
Deck cracking types are diagramatically illustrated in Figure 1. Record degree and type of cracking and approximate average of spacing between cracks. Record the greatest scaling depth encountered. Spalling should be recorded under scaling.

The survey form classifications for <u>Degree</u> of Cracking and Spalling are listed as 1. None, 2. Minor, 3. Moderate, 4. Extensive, 5. Severe and 6. Failure. The General Deck Condition pictures included herein should be used, within parallel classifications, to interpret the <u>Degree</u> of Cracking and Spalling classifications. Figure 2 shows this relationship.

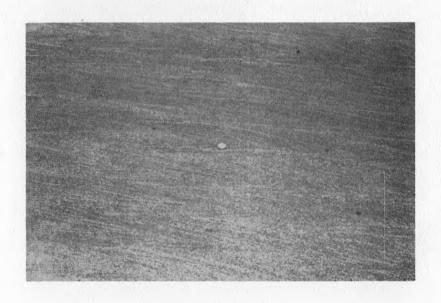
Figure 3 should be used as a guide in determining $\underline{\text{Degree}}$ of Delamination.



GOOD: NO CRACKING, SPALLING, SCALING, DELAMINATION OR ROUGHNESS.

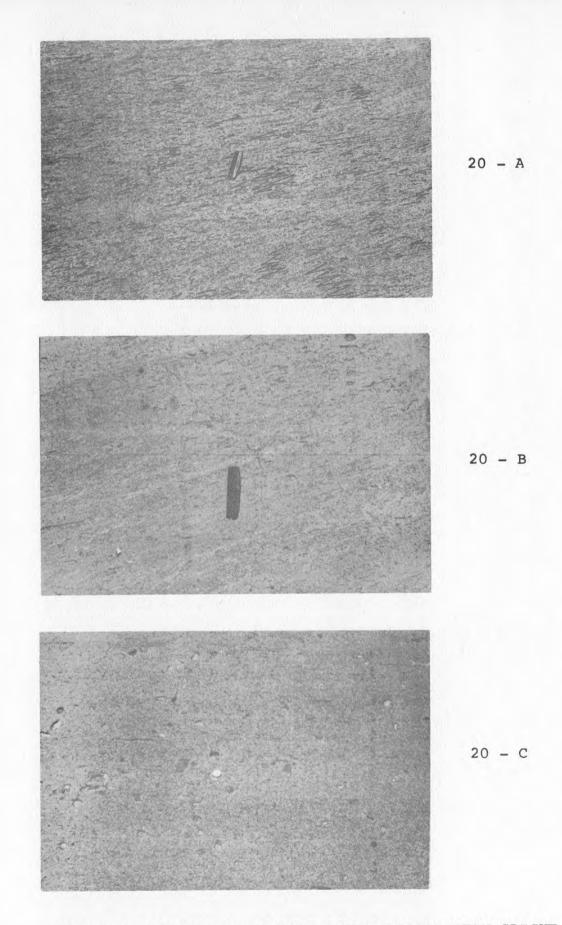


10 - D

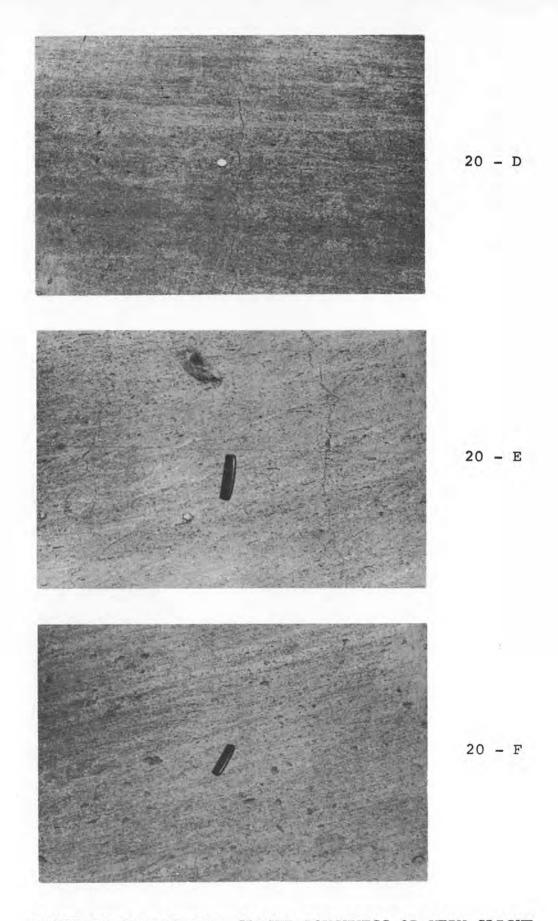


10 - E

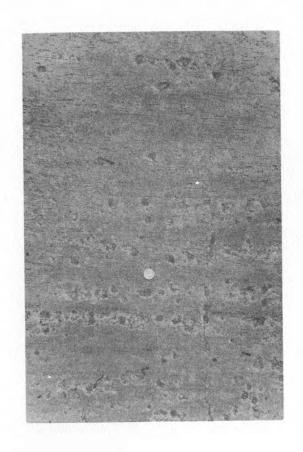
GOOD: NO CRACKING, SPALLING, SCALING, DELAMINATION OR ROUGHNESS.



MINOR FINE CRACKING, SLIGHT ROUGHNESS OR VERY SLIGHT, 20. SHALLOW AND INFREQUENT SPALLING OR SCALING. OR COM-BINATION THEREOF. NO DELAMINATION.

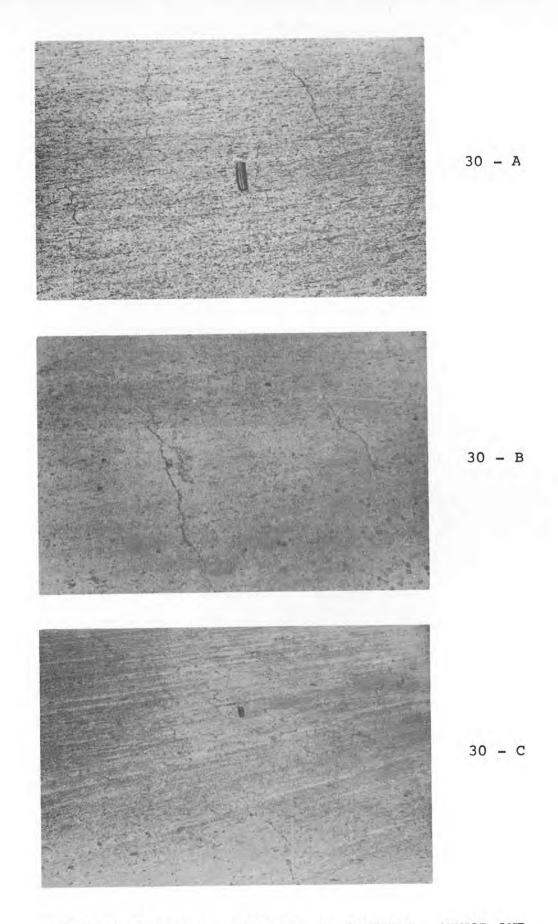


MINOR FINE CRACKING, SLIGHT ROUGHNESS OR VERY SLIGHT, 20. SHALLOW AND INFREQUENT SPALLING OR SCALING. OR COM-BINATION THEREOF. NO DELAMINATION.

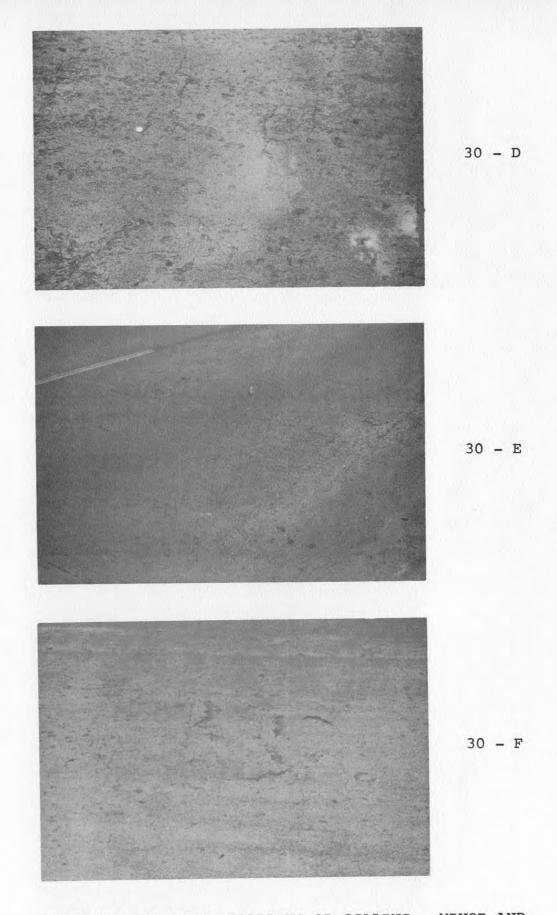


20 - G

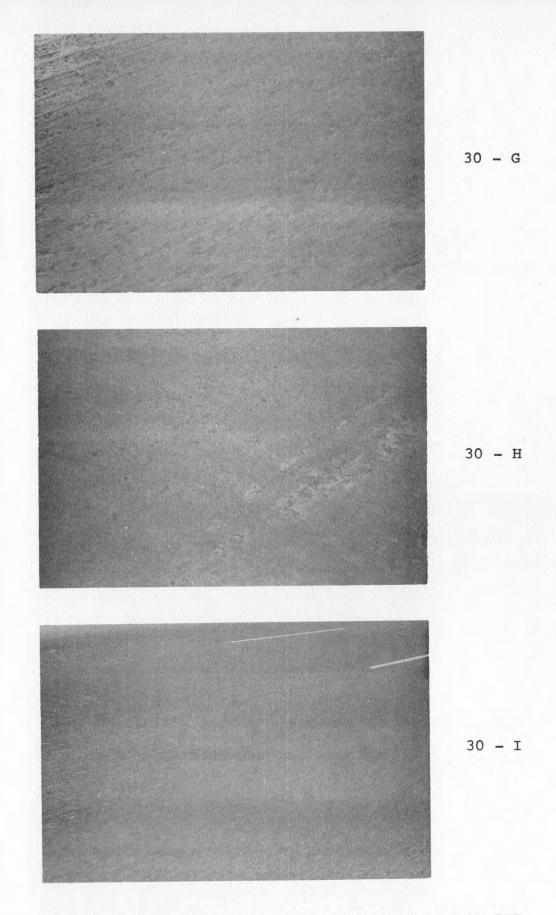
MINOR FINE CRACKING, SLIGHT ROUGHNESS OR VERY SLIGHT, SHALLOW AND INFREQUENT SPALLING OR SCALING. OR COMBINATION THEREOF. NO DELAMINATION.



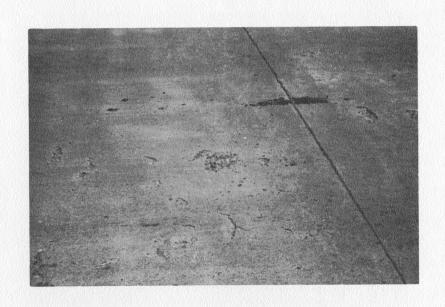
MODERATE CRACKING, SPALLING OR SCALING. MINOR AND INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.



MODERATE CRACKING, SPALLING OR SCALING. MINOR AND 30. INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.

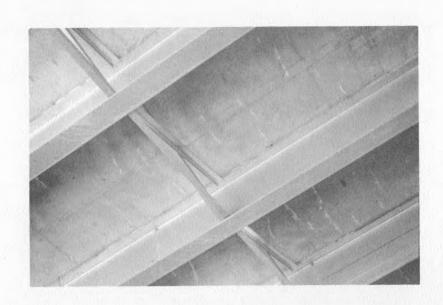


MODERATE CRACKING, SPALLING OR SCALING. MINOR AND 30. INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.

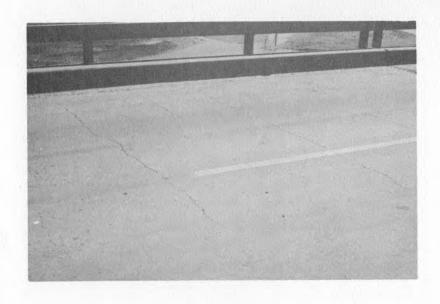


30 - J

MODERATE CRACKING, SPALLING OR SCALING. MINOR AND 30. INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.

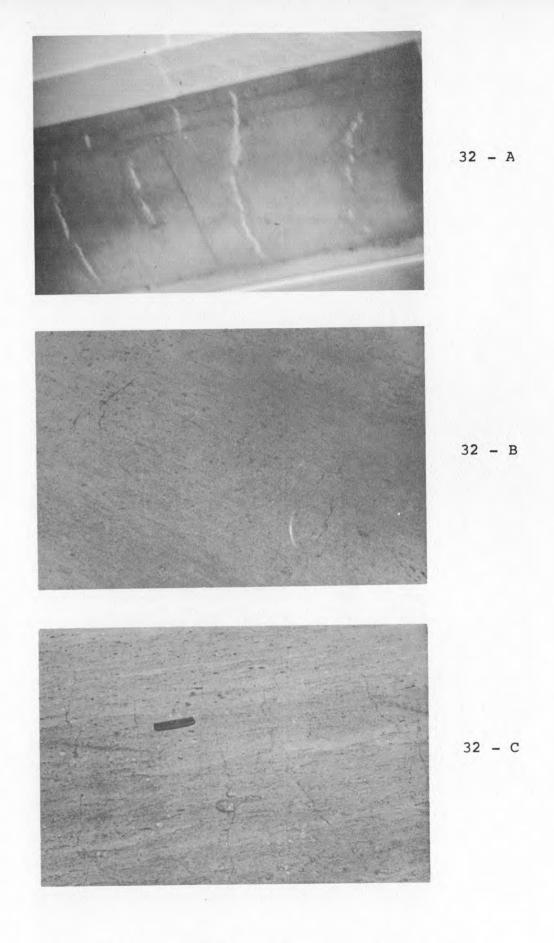


31 - A

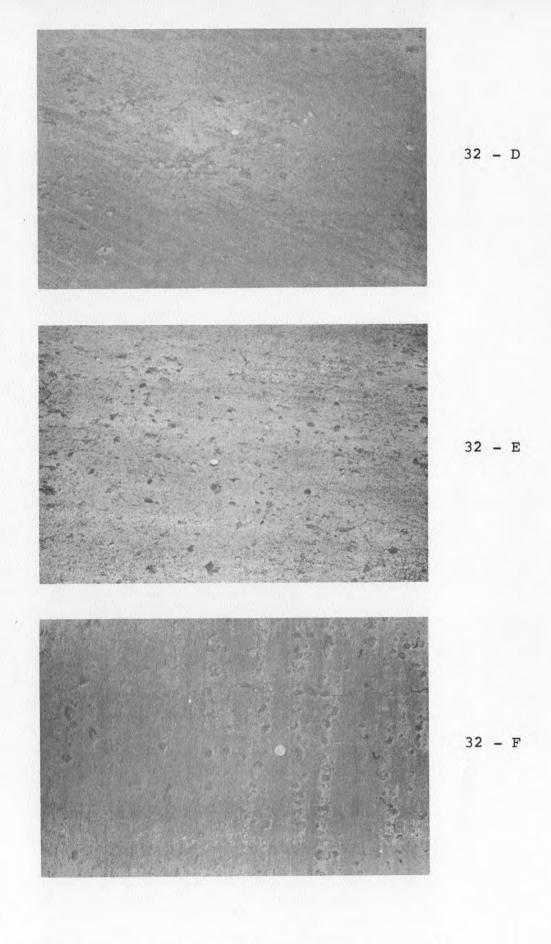


31 - B

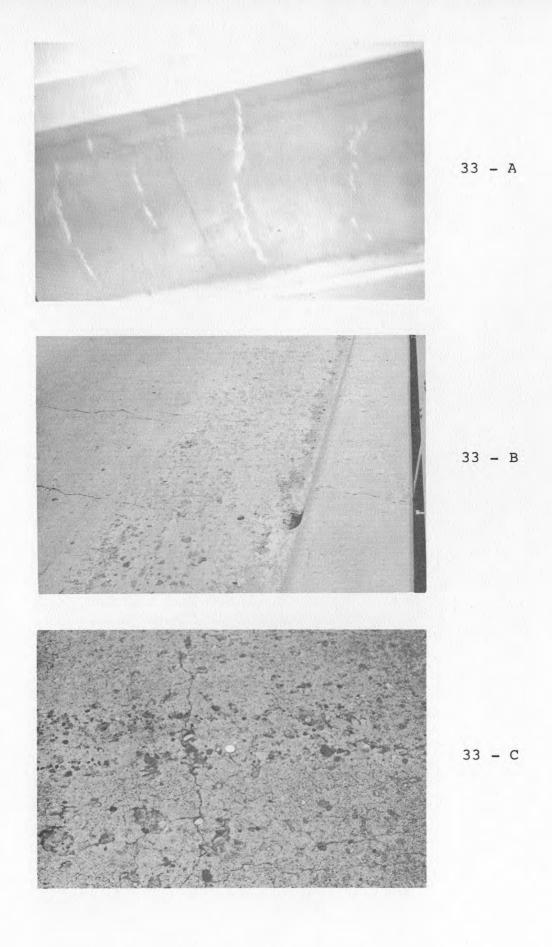
31. TRANSVERSE CRACKS ON BOTTOM OF DECK SHOWING LEAKAGE.



32. LEAKING TRANSVERSE CRACKS COMBINED WITH 20.



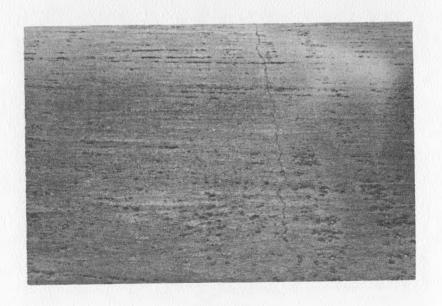
32. LEAKING TRANSVERSE CRACKS COMBINED WITH 20.



33. LEAKING TRANSVERSE CRACKS COMBINED WITH 30.

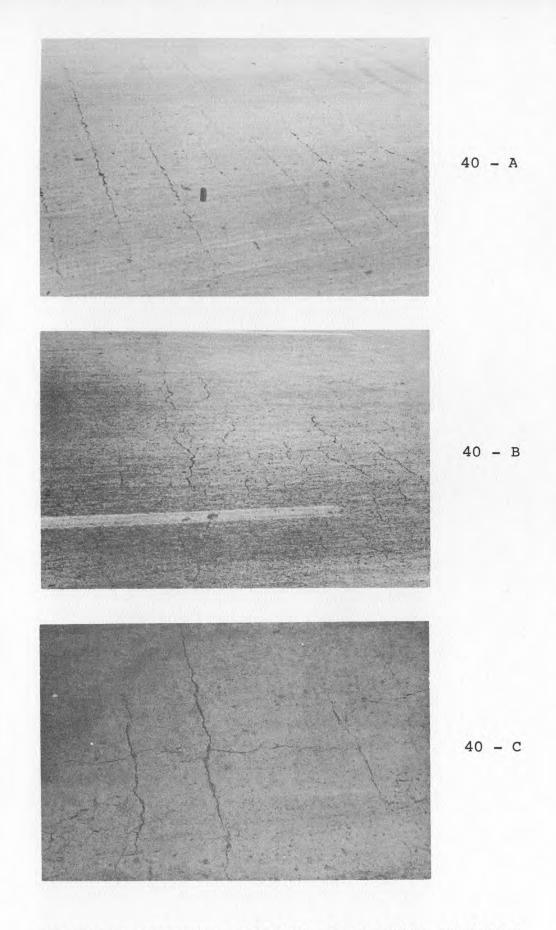


33 - D

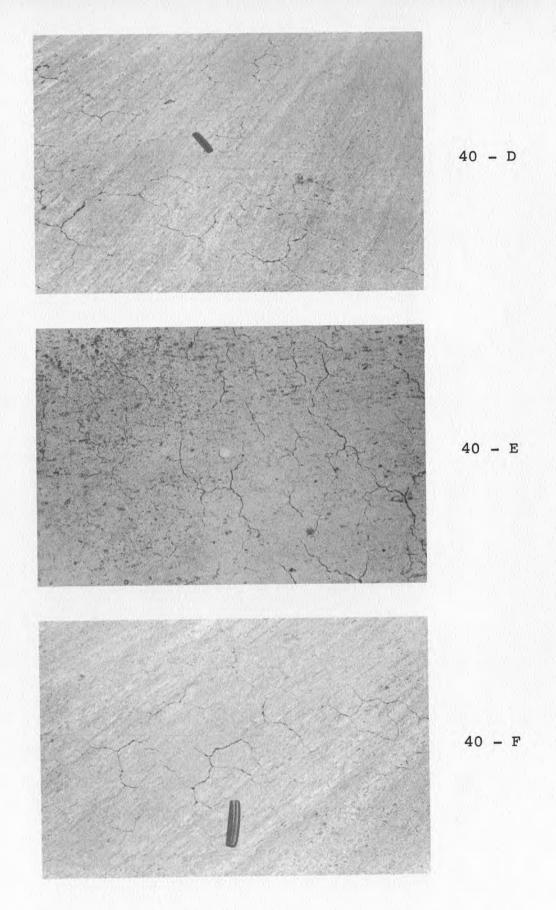


33 - E

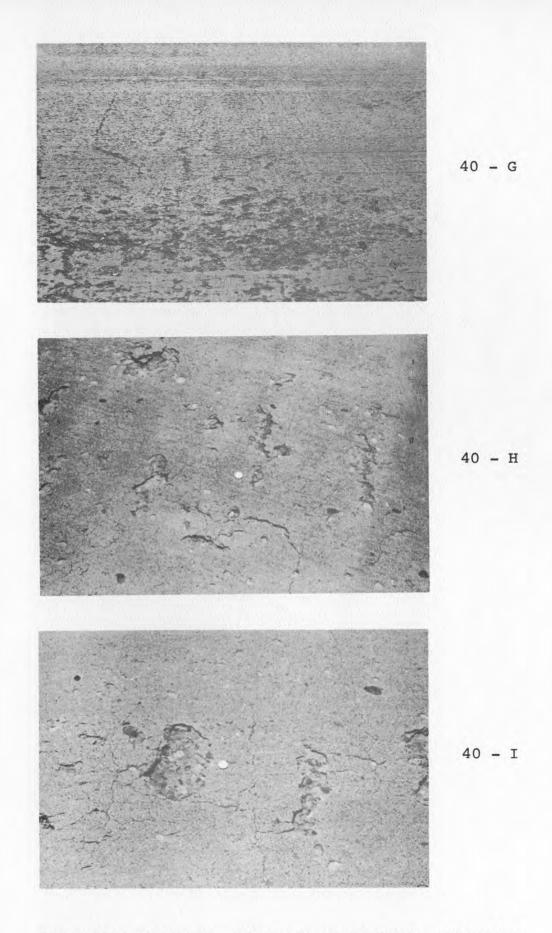
33. LEAKING TRANSVERSE CRACKS COMBINED WITH 30.



EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POPOUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR COMBINATION THEREOF.

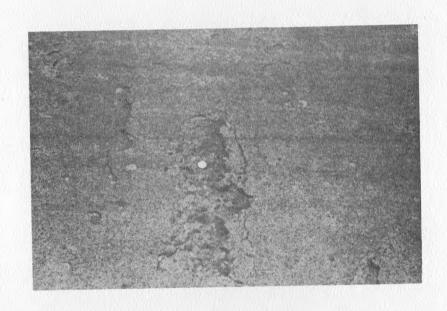


EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE
DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POPOUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR
COMBINATION THEREOF.



EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE

DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POPOUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR
COMBINATION THEREOF.

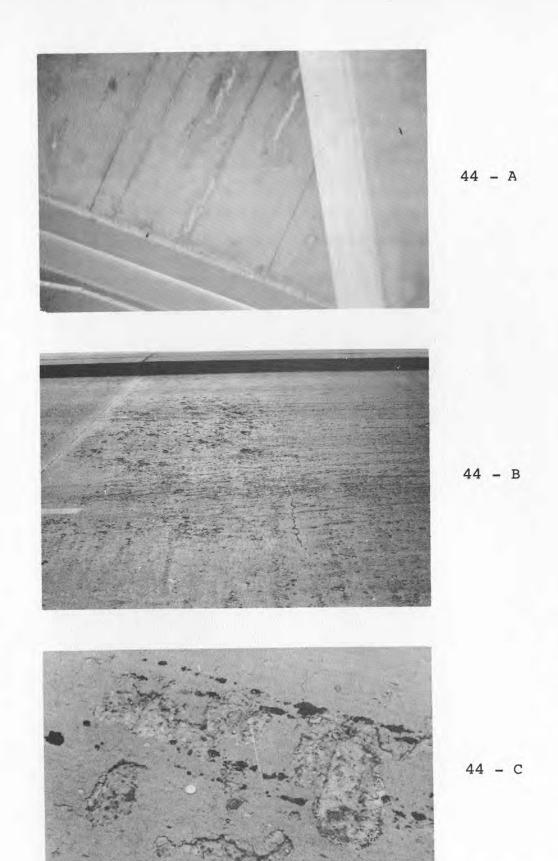


40 - J



40 - K

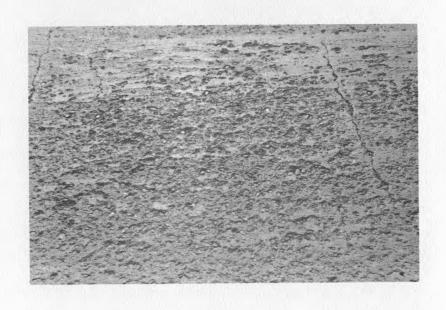
40. EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POPOUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR COMBINATION THEREOF.



44. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 40.



44 - D

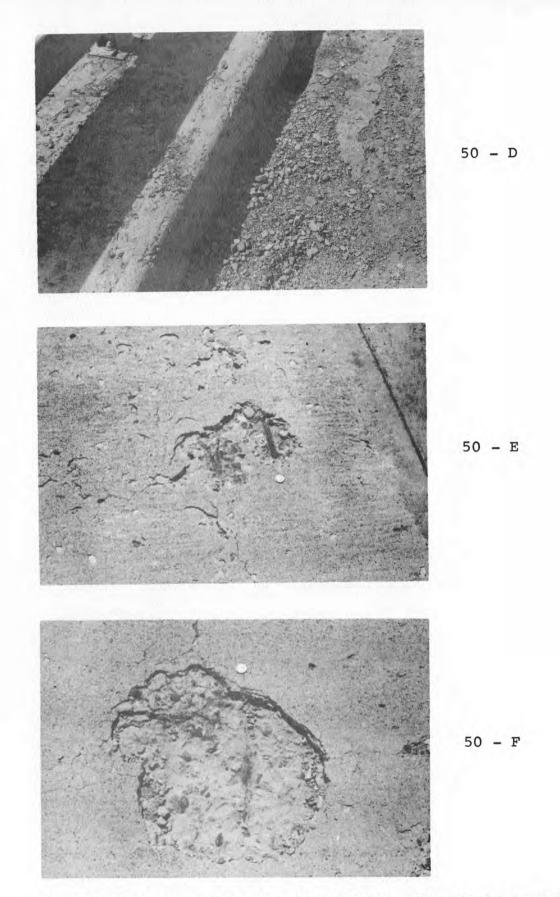


44 - E

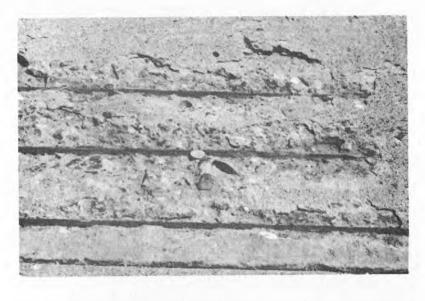
44. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 40.



SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING.
EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING
TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.



SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING.
EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING
TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.



50 - G



50 - H



50 - I

SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING.
EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING
TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.

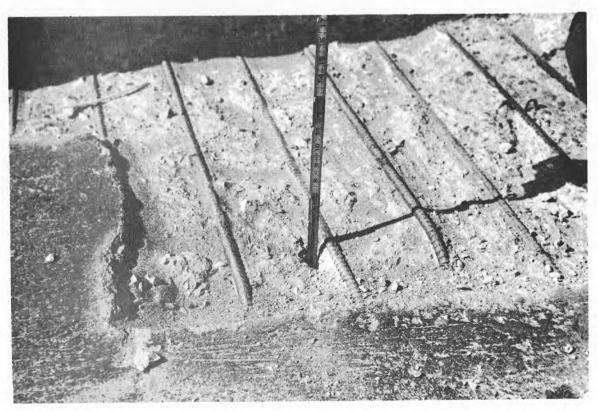


50 - J

(Tension Cracking)

SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING.
EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING
TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.





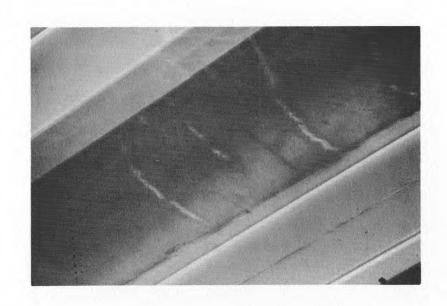
Photographs taken during investigation and removal of separated concrete and showing very extensive delamination.

(50. Cont'd)



Photographs taken during investigation and removal of separated concrete and showing very extensive delamination.

(50. Cont'd)



51 - A



51 - B

51. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 50.

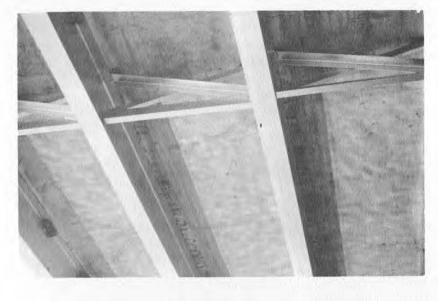


51 - C



51 - D

51. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 50.



52 - A

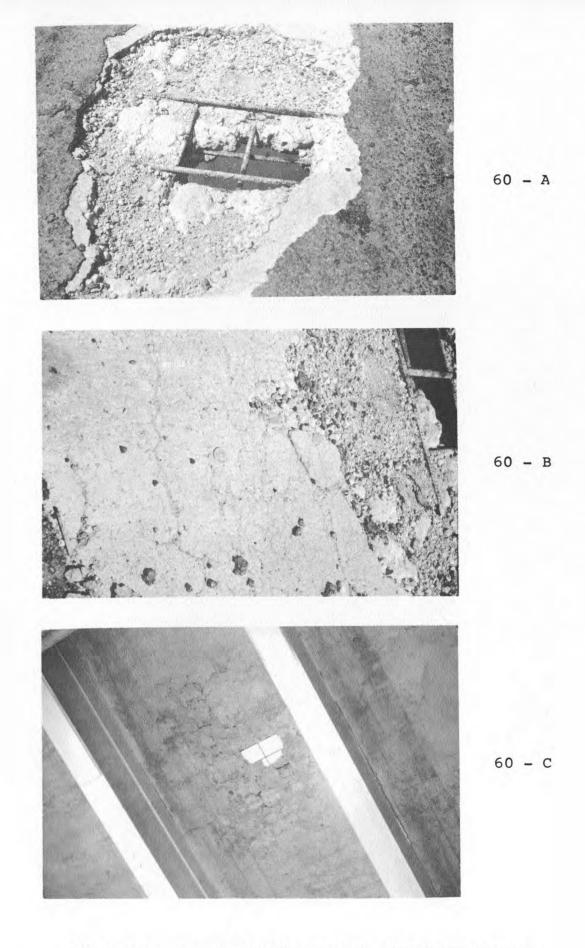


52 - B



52 - C

EXTENSIVE OR SEVERE TENSION CRACKING ON BOTTOM OF DECK COMBINED WITH ANY OF THE ABOVE. (REPLACE LAST DIGIT, 2, TO DENOTE COMBINATION. i.e., 54 INDICATES 52 COMBINED WITH 40.



DECK FAILURE: CRACKING THROUGH DECK WITH LOSS OF INTEGRITY BETWEEN CONCRETE AND STEEL OR HOLES COMPLETELY THROUGH DECK.

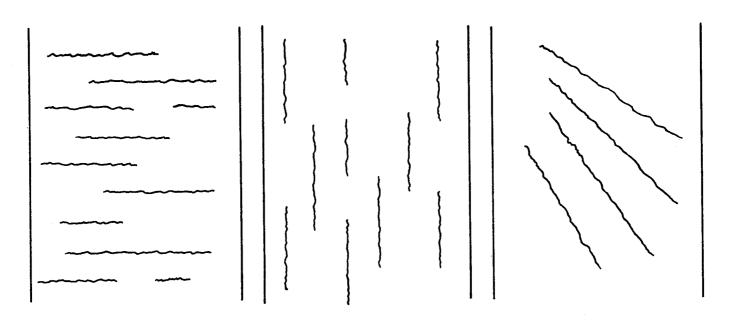


Photograph showing localized deck failure with extensive delamination (uncovered).

GENERAL DECK CONDITION

- 10. GOOD: NO CRACKING, SPALLING, SCALING, DELAMINATION OR ROUGHNESS.
- 20. MINOR FINE CRACKING, SLIGHT ROUGHNESS OR VERY SLIGHT, SHALLOW AND INFREQUENT SPALLING OR SCALING. OR COMBINATION THEREOF. NO DELAMINATION.
- 30. MODERATE CRACKING, SPALLING OR SCALING. MINOR AND INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.
- 31. TRANSVERSE CRACKS ON BOTTOM OF DECK SHOWING LEAKAGE.
- 32. LEAKING TRANSVERSE CRACKS COMBINED WITH 20.
- 33. LEAKING TRANSVERSE CRACKS COMBINED WITH 30.
- 40. EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POPOUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR COMBINATION THEREOF.
- 44. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 40.
- 50. SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING. EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.
- 51. LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 50.
- 52. EXTENSIVE OR SEVERE TENSION CRACKING ON BOTTOM OF DECK COMBINED WITH ANY OF THE ABOVE. (REPLACE LAST DIGIT, 2, TO DENOTE COMBINATION. i.e., 54 INDICATES 52 COMBINED WITH 40.
- 60. DECK FAILURE: CRACKING THROUGH DECK WITH LOSS OF INTEGRITY BETWEEN CONCRETE AND STEEL OR HOLES COMPLETELY THROUGH DECK.

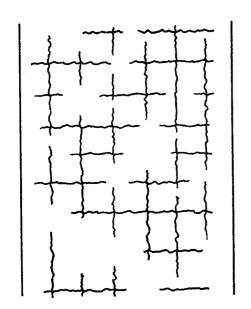
Summary List



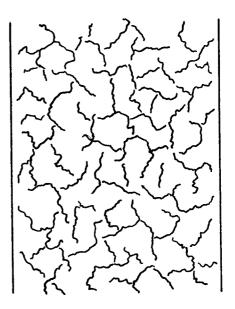
Transverse

Longitudina1

Diagona1



Checkerboard



Map, Alligator or Random

FIGURE 1

Types of Cracking

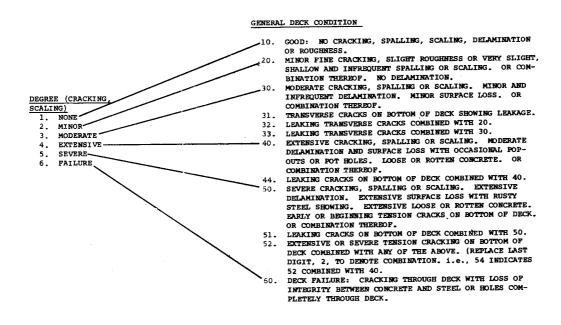
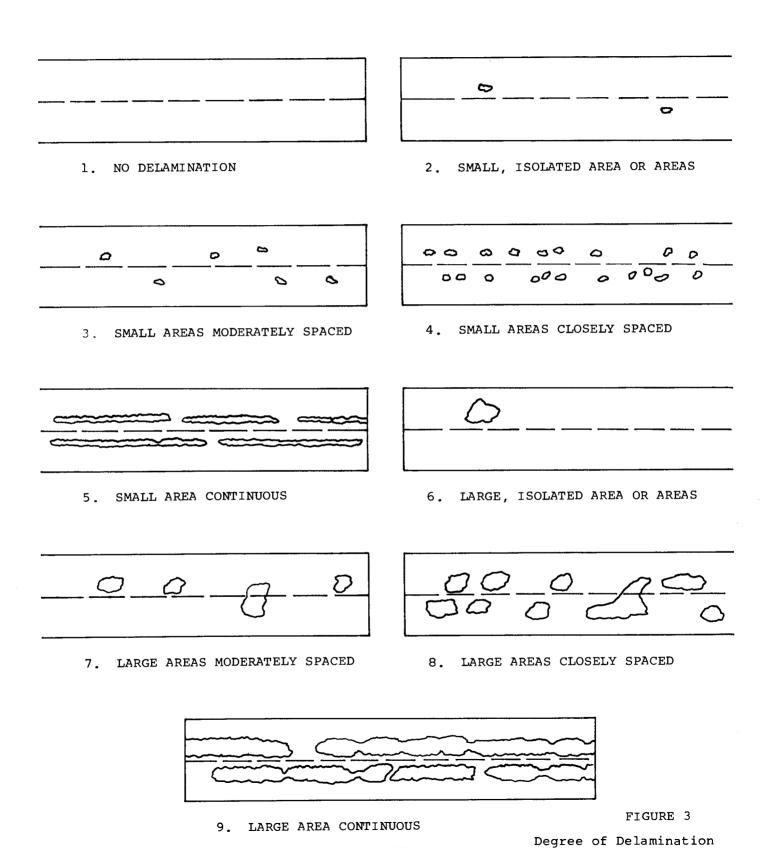
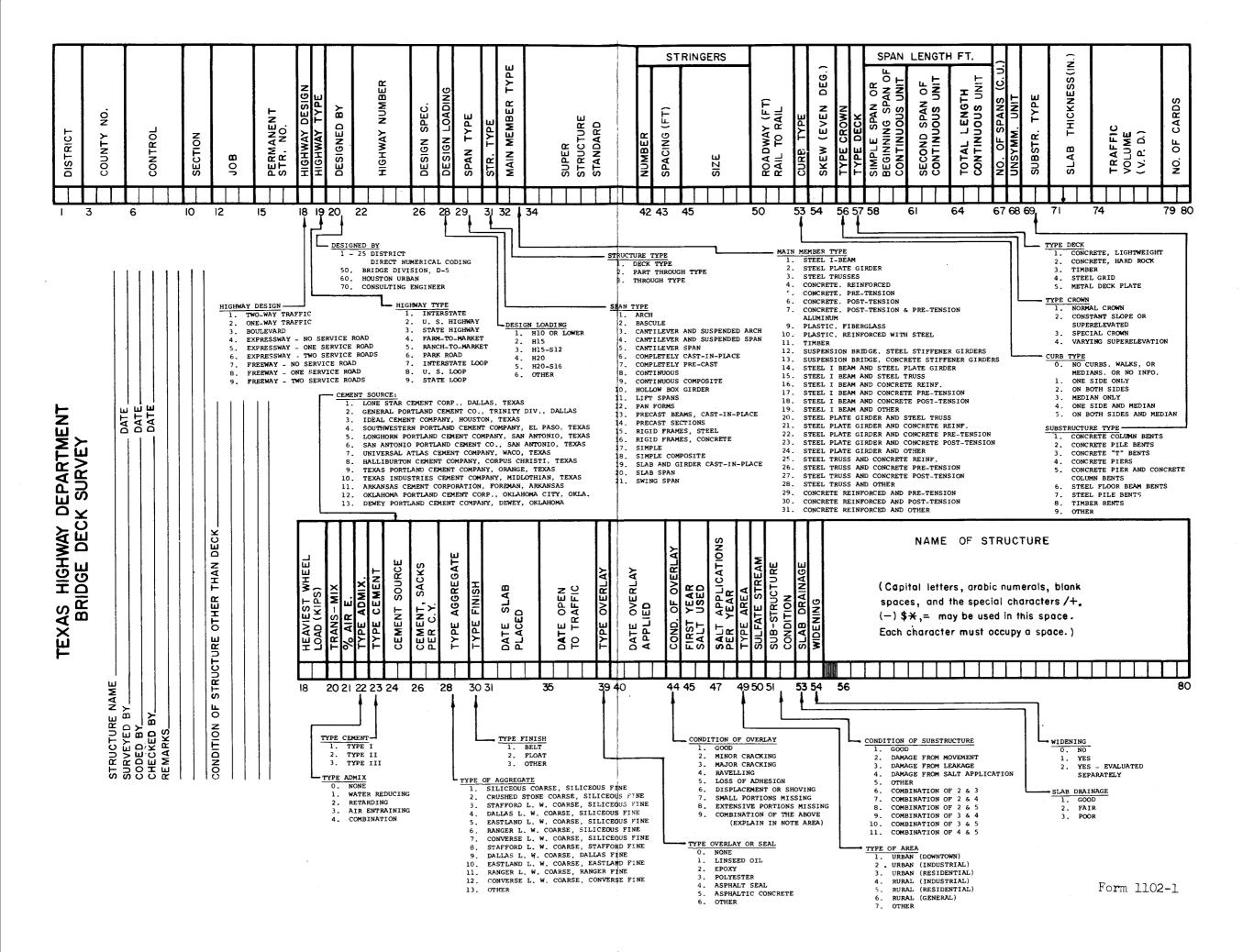
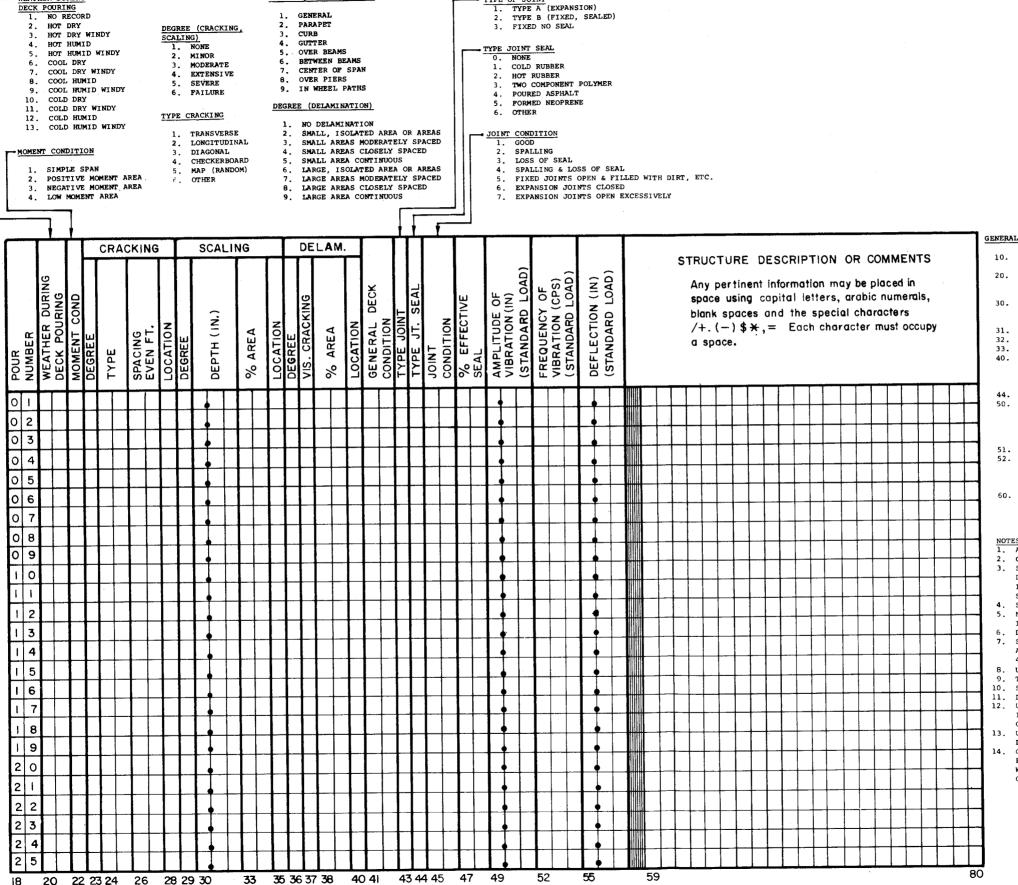


FIGURE 2

Relationship Beween Classifications







TYPE OF JOINT

LOCATION (CRACKING,

SCALING, DELAMINATION)

WEATHER DURING

GENERAL DECK CONDITION

- 10. GOOD: NO CRACKING, SPALLING, SCALING, DELAMINATION OR ROUGHNESS.
- 20. MINOR FINE CRACKING, SLIGHT ROUGHNESS OR VERY SLIGHT, SHALLOW AND INFREQUENT SPALLING OR SCALING. OR COM-BINATION THEREOF. NO DELAMINATION.
 MODERATE CRACKING, SPALLING OR SCALING. MINOR AND
- INFREQUENT DELAMINATION. MINOR SURFACE LOSS. OR COMBINATION THEREOF.
- TRANSVERSE CRACKS ON BOTTOM OF DECK SHOWING LEAKAGE.
- LEAKING TRANSVERSE CRACKS COMBINED WITH 20. LEAKING TRANSVERSE CRACKS COMBINED WITH 30.
- EXTENSIVE CRACKING, SPALLING OR SCALING. MODERATE DELAMINATION AND SURFACE LOSS WITH OCCASIONAL POP-OUTS OR POT HOLES. LOOSE OR ROTTEN CONCRETE. OR COMBINATION THEREOF.
- LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 40.
- SEVERE CRACKING, SPALLING OR SCALING. EXTENSIVE DELAMINATION. EXTENSIVE SURFACE LOSS WITH RUSTY STEEL SHOWING. EXTENSIVE LOOSE OR ROTTEN CONCRETE. EARLY OR BEGINNING TENSION CRACKS ON BOTTOM OF DECK. OR COMBINATION THEREOF.
- LEAKING CRACKS ON BOTTOM OF DECK COMBINED WITH 50. EXTENSIVE OR SEVERE TENSION CRACKING ON BOTTOM OF DECK COMBINED WITH ANY OF THE ABOVE. (REPLACE LAST DIGIT, 2, TO DENOTE COMBINATION. i.e., 54 INDICATES
- 52 COMBINED WITH 40. DECK FAILURE: CRACKING THROUGH DECK WITH LOSS OF INTEGRITY BETWEEN CONCRETE AND STEEL OR HOLES COM-PLETELY THROUGH DECK.

- 1. ALL DATES, GIVE MONTH AND YEAR.
- COUNTY NO. -USE TEXAS HIGHWAY DEPT. COUNTY NO. SUPER STRUCTURE STANDARD-GIVE ACTUAL STANDARD
- DESIGNATION OR AN "AGREED STANDARD DESIGNATION" IF THE STANDARD DESIGNATION TAKES TOO MUCH SPACE.
- SPAN LENGTHS (EVEN FEET)
- NUMBER OF CARDS-GIVE TOTAL NUMBER OF LINES FILLED IN FRONT AND BACK
- DESIGN SPECIFICATION -- GIVE YEAR. SIZE STRINGERS -- USE 30108 FOR 30WF108 AND SIMILAR
- ACCEPTED DESIGNATIONS SUCH AS TYPE A, SIZE 54,
- UNSYMMETRICAL UNIT -- 0 IF NO, 1 IF YES. TRANSIT MIX -- 0 IF NO, 1 IF YES.
- SULFATE STREAM -- 0 IF NO, 1 IF YES. DELAM: VIS. CRACKING -- 0 IF NO. 1 IF YES.
- USE A SEPARATE SHEET FOR WIDENED PORTION OF A STRUCTURE IF DESIGN OR CONDITION IS MATERIALLY DIFFERENT FROM ORIGINAL PORTION OF STRUCTURE.
- USE A SEPARATE SHEET FOR PORTIONS OF STRUCTURE OF DIFFERENT DESIGN OR WHERE OTHER CONFLICT OF DATA MAY EXIST.
- GENERAL DECK CONDITION -- THE NUMERICAL CLASSIFICATION PROVIDED MAY BE SUPPORTED OR CLARIFIED WHEN NECESSARY BY WRITTEN NOTES SHOWING ANY UNUSUAL CONDITION OR COMBINATION

