

PPS - Lincoln High School - Grandstand Assessment



View From Underside of Grandstand

ABHT Project #11516
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Submitted to:

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EXECUTIVE SUMMARY

Portland Public Schools was concerned that the Lincoln High School football field grandstands at the Bleacher Rows/Terrace Levels was being compromised structurally due to water damage. The goal of ABHT's work was to review existing drawings and perform site observations in order to assess areas of the grandstand which had potentially been damaged due to water. Our assessment was based on the following:

1. Review of existing as-built drawings (drawing #8) dated September 1951, that ABHT was provided from Portland Public Schools (PPS).
2. Multiple site observations were performed by representatives of ABHT Structural Engineers between the months of April and June 2016.
3. Limited calculations/analysis were performed.

BUILDING SUMMARY

The Lincoln High School football field grandstands were constructed circa 1951. While PPS had contracted us to mainly review the Bleacher Rows/Terrace levels, we did also perform a cursory review of other areas of the Grandstand as well. Attached drawings have been provided within this assessment to provide a better understanding of the existing structure, observations, and recommendations. The grandstand existing structure has been shown on the attached drawings. The attached drawings to this assessment are as follows:

DRAWING S1 - OVERALL FOUNDATION PLAN
DRAWING S2 - OVERALL FRAMING PLAN
DRAWING S3 - OVERALL BLEACHER PLAN AND SECTION
DRAWING S4 - ENLARGED BLEACHER PLAN
DRAWING S5 - ENLARGED BLEACHER PLAN
DRAWING S6 - ENLARGED BLEACHER PLAN
DRAWING S7 - PARTIAL PLAN AND DETAILS
DRAWING S8 - OBSERVATIONS/RECOMMENDATIONS TABLES

Please note that the all recommendations and details noted within this report and within the attached drawings are preliminary and are not meant to be used for construction.

BLEACHER ROWS/TERRACE LEVELS SUMMARY

During our review of the bleacher rows, we noticed many different conditions and levels of rot/weathering/damage. We grouped our areas of concern into different categories as indicated on the Enlarged Bleacher Plans (Drawings S4, S5, and S6) and the Bleacher Observations/Recommendations Table shown on Drawing S8. All observations and recommendations have been indicated within the attached drawings.

Each bleacher row is composed of (3) individual flat 2x8 bleacher boards (assumed DFL no. 2 grade) spanning 6'-0" to its supports. It does not appear the original boards are pressure treated. The boards are tied together with an existing PT 3x4 member at the center of the span to share loads between the supports. The aisles have additional blocking at its front and back which provides further stiffening of the aisle sections. We reviewed each individual board to span to its supports with either a 100 PLF (pounds per linear foot) load or a 300# point load in the center of the span. The original board material (assumed again to be DFL no. 2 grade), while not pressure treated and therefore prone to water damage, is not far from adhering to the current building code allowable stresses since the boards are tied together at mid-span as shown on the bleacher partial plan and associated existing details on 2 and 3 on Drawing S7.

However, please reference note #1 and #2, below the Bleacher Observations/Recommendations Table shown on Drawing S8, which recommends all mid-span blocking along with the added blocking at the aisles sections be reviewed and repaired as required.

All new replacement boards are indicated to be pressure treated flat 2x8 select structural grade with the added ties per the bleacher partial plan and associated details on Drawing S7. This assembly will meet current building code allowable stresses.

Lastly, it is important to note that there are a few existing as-built discrepancies from the drawings. The drawings indicated that the steel rakers were to be 12" deep wide flange beams and also did not show an added wide flange beam to support the back side of the press box. The existing field conditions contain 16" deep built-up steel angle trusses for each raker along with an added steel wide flange beam with HSS columns at each end to support the back side of the press box.

STRUCTURAL OBSERVATIONS/RECOMMENDATIONS

All of our structural observations and recommendations have been noted within the attached drawings.

REPORT INFORMATION PROVIDED

This assessment contains the following information:

- **Figures/Photos**

- **Foundation Figures**

- Observation photos at the foundation level of the structure.

- **Steel Structure Figures**

- Observation photos of the steel structure.

- **Drawings S1 through S8**

- Indicated within the building summary section.

DISCLAIMER

No liability of the existing structure is assumed based on the issuance of this assessment. Due to the limitations of this assessment and the fact that not every area of the grandstand was reviewed, it is possible that other issues exist. Limitations of this needs assessment include: observations only readily available to view and limited calculations/analysis performed. Guarantees cannot be made that construction or engineering problems, concealed or otherwise, could exist.

FOUNDATION FIGURES



FIGURE F1A: CRACKING AND SPALLING IN FRONT BEARING CONCRETE WALL



FIGURE F1B: CRACKING AND SPALLING IN FRONT BEARING CONCRETE WALL



FIGURE F1C: CRACKING AND SPALLING IN FRONT BEARING CONCRETE WALL



FIGURE F1D: SPALLING AT TOP OF WALL JOINT



FIGURE F1E: CRACKING AND SPALLING AT TOP OF CONCRETE WALL



FIGURE F2A: MINOR CRACKING IN FRONT BEARING CONCRETE WALL (TYPICAL OF ENTIRE WALL)



FIGURE F2B: MINOR SPALLING AT TOP OF WALL JOINT



FIGURE F2C: MINOR VERTICAL CRACKING IN WALL (TYPICAL OF ENTIRE WALL)



FIGURE F2D: MINOR VERTICAL CRACKING IN WALL (TYPICAL OF ENTIRE WALL)



FIGURE F2E: MINOR VERTICAL CRACKING IN WALL (TYPICAL OF ENTIRE WALL)



FIGURE F3A: EXPOSED REBAR WITH MINOR CRACKING AND SPALLING



FIGURE F4A: CONCRETE WALL SEPARATION AT CORNER



FIGURE F5A: CONCRETE EROSION DUE TO WATER

STEEL STRUCTURE FIGURES



FIGURE S1A: STEEL COLUMN DAMAGE



FIGURE S1B: STEEL COLUMN DAMAGE



FIGURE S1C: STEEL COLUMN DAMAGE



FIGURE S1D: STEEL COLUMN DAMAGE



FIGURE S1E: STEEL COLUMN DAMAGE



FIGURE S2A: TYPICAL SLIGHT CORROSION



FIGURE S2B: TYPICAL SLIGHT CORROSION



FIGURE S2C: TYPICAL SLIGHT CORROSION



FIGURE S2D: TYPICAL SLIGHT CORROSION



FIGURE S2E: TYPICAL SLIGHT CORROSION



FIGURE S2F: TYPICAL SLIGHT CORROSION



FIGURE S2G: TYPICAL SLIGHT CORROSION



FIGURE S2H: TYPICAL SLIGHT CORROSION



FIGURE S3A: SLIGHT CORROSION ON COLUMN ALONG WITH EMBEDDED DEBRIS



FIGURE S3B: SLIGHT CORROSION ON COLUMN ALONG WITH EMBEDDED DEBRIS



FIGURE S3C: SLIGHT CORROSION ON COLUMN ALONG WITH EMBEDDED DEBRIS



FIGURE S3D: SLIGHT CORROSION ON COLUMN ALONG WITH EMBEDDED DEBRIS



FIGURE S4A: SIGNIFICANT CORROSION ON STEEL BEAM ADDED FOR PRESSBOX



FIGURE S4B: SIGNIFICANT CORROSION ON STEEL BEAM ADDED FOR PRESSBOX



FIGURE S4C: SIGNIFICANT CORROSION ON STEEL BEAM ADDED FOR PRESSBOX



FIGURE S5A: BLEACHER BOARD STEEL SUPPORT RUSTING FROM TOP



FIGURE S5B: BLEACHER BOARD STEEL SUPPORT RUSTING FROM TOP



FIGURE S5C: BLEACHER BOARD STEEL SUPPORT RUSTING FROM TOP