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STRUCTURAL PROTECTION STUDIES

TO JUNE 30, 1941

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Approved August 4, 1941  
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COMMITTEE ON AUGUST 4, 1941  
BY RICHARD C. TOLMAN

  
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This report -- No. A-17 -- is pertinent to the projects designated CE-5 and CE-6 in the records of the War Department's NDRC Liaison Officer.

Disposition of copies of this report--  
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## STRUCTURAL PROTECTION STUDIES TO JUNE 30, 1941

In order to present a comprehensive picture of the status of these studies of structural protection, the text of the preceding report<sup>1/</sup> is reproduced here and is followed by a description of subsequent developments.

### 1. Text of preceding report<sup>1/</sup>

Progress Report No. A-3 of the National Defense Research Committee entitled "Structural Protection Studies to March 15, 1941," describes the relations existing between Section B, Division A, NDRC, and the Committee on Passive Protection Against Bombing (PPAB) of the National Research Council. The Committee on Passive Protection Against Bombing is engaged in studies of a nature indicated by its name, under a contract between the Corps of Engineers, U.S. Army, and the National Academy of Sciences.

Professor H.P. Robertson, of the Committee on PPAB, has prepared an interim report on penetration phenomena. It is a critical survey of the literature and its theory, entitled Terminal Ballistics. This was submitted to the Fortifications Section, Office of the Chief of Engineers as of January, 1941. Through the courtesy of that office, copies were deposited with the Office of the Secretary, National Defense Research Committee. There is also available a summary of this report.

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<sup>1/</sup> J. Burchard, Structural protection studies to May 7, 1941, NDRC Report No. A-5, Progress Report.

On May 7, 1941, the Committee on PPAB delivered to the Fortifications Section, Office of the Chief of Engineers, U. S. Army, three copies of Terminal Ballistics II: Experimental Study of Penetration in Concrete, by Walker Bleakney and Richard A. Beth. This report is the property of the Corps of Engineers.

Arrangements have been made so that anyone in the NDRC organization who needs to read this report can do so either through normal liaison channels with the Army, or by arrangements with the Executive Officer of the Committee on PPAB.

It should be said that the report is distinctly a progress report and deals with methods of attack far more than with results. Some data are reported, but it is believed that the document will be of interest only to those who are following the problem very closely.

## 2. Subsequent developments

On June 30, 1941 the Committee on Passive Protection Against Bombing delivered to the Fortifications Section, Office of the Chief of Engineers, U.S. Army, copies of its "Final Report" to the U.S. Corps of Engineers for Year Ending June 30, 1941. This report appears in four, separately bound parts, as follows:

- Part I. Introduction; The problem of defeating an explosive projectile (Direct hit). This part is classified as confidential; it describes all the work done at Princeton University, interprets the data there accumulated, and so forth.

- Part II. The problem of defeating an explosive projectile (Nearby hit; collateral questions). This part is secret; it contains an interpretation of pertinent British research.
- Part III. Economics of structural and raid protection. This part, which is not classified, deals with the economics of shelters.
- Part IV. Summary; Rational design; Suggestions for future research. This part is confidential; it contains a summary of methods of using the information so far gained, a discussion of the question of rational design and an annotated list of problems for further investigation.

These four parts constitute a "final report" only in the sense that they are intended to meet a requirement of the original contract that such a report be made. Actually, the work is being continued under a renewed contract and with augmented funds.

Four copies of each part of the report have been sent through the Liaison Officer of the Office of Scientific Research and Development to Dr. Charles Darwin, of the British Central Scientific Office, for transmission to British workers on similar problems. An additional copy is on file in the OSRD Liaison Office.

Further copies may be secured by application to the Fortifications Section, Office of the Chief of Engineers, U.S. Army, through military liaison channels. However, the number of copies available is distinctly limited.