

N.B.S.1

ADDRESS BUREAU OF SHIPS, NAVY DEPARTMENT
AND REFER TO NO.

C-BB/S1-1 (370)

ENCLOSURES

NAVY DEPARTMENT

BUREAU OF SHIPS

WASHINGTON, D. C.

MEMORANDUM

JUL 13 1942

From: The Chief of the Bureau of Ships.
To : The Chairman, General Board.
Subject: Battleships - Protection Characteristics.
Enclosure: (herewith)
(A) Tabulation of Protection Characteristics of
Various Ships - 1 copy.

1. In compliance with an oral request from Rear
Admiral G. J. Rowcliff, U.S.N., Enclosure (A) is forwarded
herewith for the information of the General Board.

RECEIVED S-C FILES

Room 2055

JUL 18 1942

ROUTE TO: *Gen. Bd*

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H. S. Howard
by Direction

GENERAL BOARD

JUL 14 1942

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1854
Turret Tops)
Conning Tower (top)) No penetration
Steering gear compt. (top))
Steering leads (weakest spot)

2007 N.O. DOME is broken up
by 2" of armor from altitudes
over ~~3000~~ 1800 ft. (60°-300 ft. dia)

Memorandum

TABULATION OF PROTECTION CHARACTERISTICS OF VARIOUS SHIPS
(Using seven-tenths rule for laminated armor)

Range Limits Against 16", 2240# Projectiles IV = 2520 f.s. 90° T.A.

<u>INNER LIMITS</u>	<u>BB67</u>	<u>BB61</u>	<u>BB57</u>	<u>BB55</u>	<u>BB48</u>
Main Belt	16500 yds.	17600 yds.	17700 yds.	21300 yds.	25700 yds.
Barbette	17200 yds.	18000 yds.	18000 yds.	20400 yds.	26800 yds.
Conning Tower (sides)	17200 yds.	18000 yds.	20400 yds.	23000 yds.	20400 yds.
Conning Tower leads	20400 yds.	20400 yds.	20400 yds.	24500 yds.	20400 yds.
Steering Gear Compt. (sides)	15500 yds.	18000 yds.	18000 yds.	22600 yds.	26500 yds.
Steering leads (weakest spot)	(1)	C. T. leads	C.T. leads	Side armor pen. all ranges from Fr. 149-150	Main Belt
Transverse Bulkheads (Fwd.)	17000 yds.	28400 yds.	28400 yds.	28800 yds.	25600 yds.
(At 20° T.A.) (Aft)	21300 yds.	28400 yds.	28400 yds.	28800 yds.	25600 yds.

OUTER LIMITS

Main Deck (alone)	14100 yds.	Penetrated at all normal ranges			No Ballistic Deck
Main and Second Decks	34500 yds.	31200 yds.	30900 yds.	27800 yds.	15500 yds.
Turret Tops	34500 yds.	32900 yds.	32900 yds.	32000 yds.	25800 yds.
Conning Tower (top)	34500 yds.	32900 yds.	32900 yds.	32000 yds.	31600 yds.
Steering Gear Compt. (top)	36300 yds.	29900 yds.	29900 yds.	29200 yds.	20200 yds.
Steering leads (weakest spot)	(1)	29700 yds.	29700 yds.	27000 yds.	20200 yds.

(1) Eccentric tube 6" on top, 5" on sides, penetrated on normal impact at all ranges, frames 173 to 196

Release Altitudes Below Which Bombs Will Not Penetrate

Horizontal Bombing, Plane Speed 140 Knots
500# H.C. Bomb

Main Deck (alone)	No pen.	4300 ft.	4300 ft.	3900 ft.	No Ballistic Deck
Main and Second Decks)				
Turret Tops)				
Conning Tower (top))	500# H.C. Bomb is broken up by 2" of armor from altitudes over 5000 ft. (horizontal release)			
Steering gear compt. (top))	No penetration			
Steering leads (weakest spot))				

1600# A.P. Bomb

Main Deck (alone)	2500 ft.	750 ft.	750 ft.	600 ft.	No Ballistic Deck
Main and Second Decks	18000 ft.	12200 ft.	11800 ft.	8750 ft.	2600 ft.
Turret Tops	17300 ft.	14300 ft.	14300 ft.	13750 ft.	7400 ft.
Conning Tower (top)	17300 ft.	14300 ft.	14300 ft.	13750 ft.	11000 ft.
Steering Gear Compt. (top)	20300 ft.	10800 ft.	10800 ft.	10200 ft.	4500 ft.
Steering leads (weakest spot)	10200 ft.	10600 ft.	10600 ft.	8300 ft.	2600 ft.

Dive Bombing, 60° Dive, Plane Speed 300 Knots
500# H.C. Bomb

Main Deck (alone)	No pen.	1000 ft.	1000 ft.	700 ft.	No Ballistic Deck
Main and Second Decks)				
Turret Tops)				
Conning Tower (top))	500# H.C. Bomb is broken up by 2" of armor from altitudes over 1800 ft. (60°-300ft. dive)			
Steering gear compt. (top))	No penetration			
Steering leads (weakest spot))				

Release Altitudes Below Which Bombs Will Not Penetrate

Dive Bombing, 60° Dive, Plane Speed 300 Knots 1600# A.P. Bomb

	<u>BB67</u>	<u>BB61</u>	<u>BB57</u>	<u>BB55</u>	<u>BB48</u>
Main Deck (alone)	- Penetrated at all release altitudes -				No Bal-
Main and Second Decks	No pen.	Above dive	Above dive	6500 ft.	istic Deck
		release point	release point		500 ft.
Turret Tops	No pen.	No pen.	No pen.	No pen.	No pen.
Conning Tower (top)	No pen.	No pen.	No pen.	No pen.	No pen.
Steering Gear Compt. (top)	No pen.	No pen.	No pen.	No pen.	No pen.
Steering leads (weakest spot)	No pen.	No pen.	No pen.	5700 ft.	1300 ft.
					Pen. all re-
					lease altitudes

NOTE: No penetration is listed for all cases where altitude necessary for protection is greater than 6500 ft. and therefore greater than reasonable dive release points.

Splinter Protection - Ship Control Stations

Bridge Top	100#	Open top	80#	30#	None
Sides	100#	30#	80#	30#	None
Bottom	Flag Plot	30#	Flag Plot	80#	None
	Under	Located in	Under		
		Secondary			
		Conn.			
Main Director	60#	60#	60#	60#	None
Main director leads	100#	100#	100#	100#	None
(below nav. bridge)					

Magazine Protection

Main Battery	Main & 2nd Decks + 40# Splinter Deck	Main & 2nd Decks + 40# Splinter Deck	Main & 2nd Decks + 40# Splinter Deck	Main & 2nd Decks + 78# Splinter Deck	2nd Deck & 40# Splinter Deck
Secondary and AA Battery	Main & 2nd Decks + 25# Splinter Deck	Main and 2nd Decks	Main and 2nd Decks	Main and 2nd Decks	2nd Deck & 40# Splinter Deck

Gasoline Stowage

Unprotected Stern	Unprotected Stern	Unprotected Stern	Unprotected Stern	Unprotected Forward
In 4 separate tanks	In 4 separate tanks	In 2 separate tanks	Cofferdam around	Cofferdam around

Torpedo Protection Systems

All later classes, BB55 through 67, are designed to withstand attacks by 700# charges in torpedo warheads. BB48 and BB44 were designed to withstand torpedo warhead charges of about 500#, and experience at Pearl Harbor indicates the effectiveness of this design. When these classes are fitted with blisters their protection should be sufficient to withstand the effects of a 700# charge.