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$$J_T = \frac{Lb^3}{12} \quad (L = \text{length of block})$$

and, thus,

$$BM_T = \frac{J_T}{\nabla} = \frac{\frac{1}{12} Lb^3}{LbT} = \frac{b^2}{12T}$$

Hence,

$$KM_T = \frac{T}{2} + \frac{b^2}{12T} \quad (5)$$

$$\frac{d(KM_T)}{dT} = \frac{1}{2} - \frac{b^2}{12T^2}$$

and KM_T has a minimum value when,

$$\frac{d(KM_T)}{dT} = 0$$

that is, when

$$\frac{b}{T} = \sqrt{6} = 2.45$$

Equation(5) can be put in the following form:

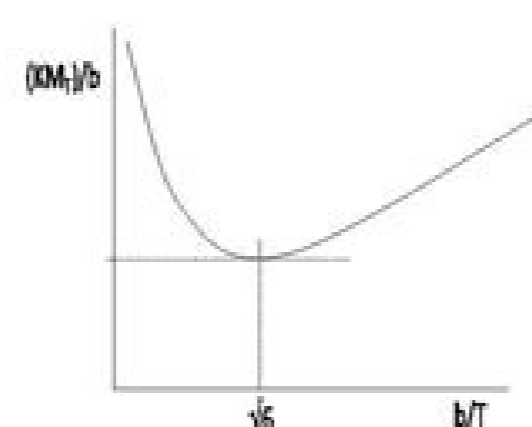
$$\frac{KM_T}{b} = 0.5 \frac{T}{b} + \frac{b}{12T}$$

The metacentric diagram for the block is as shown in Fig. 5.

Most ship forms exhibit a similar curve with a minimum at,

$$\frac{b}{T} \approx 2.5$$

Fig. 5 Variation of box parameters with KM_T



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Ship hull configuration researches and optimization for achievement best storm seakeeping and navigation safety

Исследования по оптимизации формы корпуса корабля для достижения наилучшей штормовой мореходности и безопасности мореплавания

Researches aim – searching for of technical decisions

for a non-contradictory principles to optimization of hull form and naval architecture,

founded on technical-history analysis of projects of the known ships,

and on seamanship experience in heavy conditions of sail,

which is substantiated by mathematical researches

and towing basin experiments.

Цель исследований – поиск технических решений

и принципов непротиворечивой оптимизации формы корпуса

и общекорабельной архитектуры, основанных на технико-историческом анализе

мореходности наиболее известных исторических кораблей, практическом опыте морского судовождения

в сложных условиях плавания, обоснованных теоретическими исследованиями и опытовыми экспериментами

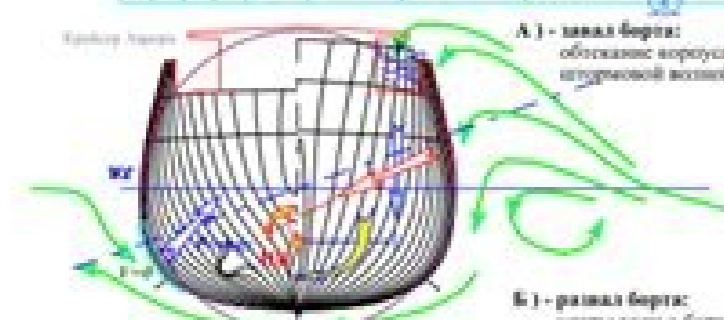
Technical-history seakeeping analyses

Технико-исторический анализ мореходности



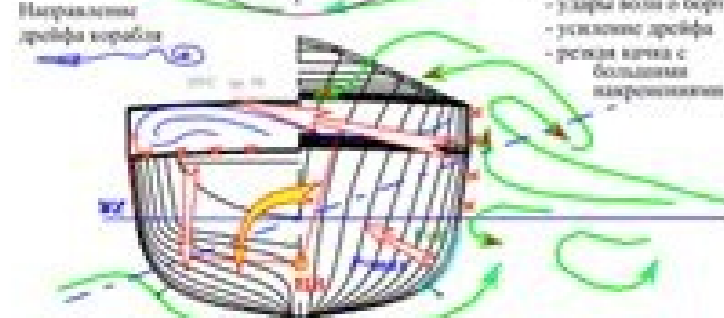
"Izmail" type destroyer
On a storm course the ship used
a "cut through" of waves

Минноносцы типа "Измаил"
на штормовом курсе использовали
режим прорезания волн



Fluidmechanics particularities of flow redistribution of wave nature forces
Гидродинамические особенности перераспределения сил волновой природы

A) – **Inner slope of board:**
Ship hull fluid flowing around by wave flow



B) – **Outer slope of board:**
– hard blows of waves to board of ship
– reinforcement of wind and wave lateral driftage
– sharp rolling with greater lists

Heave pitching give fall off propulsion, hull stabilization, as well as degrading general and longitudinal (flexural) hull strength

От интенсивности килевой качки зависит ходкость корабля, стабилизация его корпуса на волнении, а также сохранение продольной и общей прочности корпуса



Pitch damping can be provided transposition of floating forces in average part of hull (body of sea gull with extended stems)

Уменьшение внешних сил, приводящих к килевой качке, может быть обеспечено перераспределением сил всплытия в среднюю часть корпуса (тело чайки с вытянутыми шпангоутами)

A MANUAL
OF
NAVAL ARCHITECTURE.

FOR THE USE OF
OFFICERS OF THE ROYAL NAVY,
OFFICERS OF THE MERCANTILE MARINE,
SHIPBUILDERS AND SHIPOWNERS.

By W. IL. WHITE,

ASSISTANT COMMISSIONER, ROYAL NAVY; PROFESSOR IN NAVAL ARCHITECTURE,
QUEEN'S COLLEGE, OXFORD; MEMBER OF THE OFFICE OF THE COMMISSIONER
OF ROYAL ARCHITECTURE; FELLOW OF THE ROYAL SOCIETY
OF NAVAL ARCHITECTURE.



LONDON:
JOHN MURRAY, ALBEMARLE STREET,
1877.

(Through Messrs. G. & C. Blackie & Co., Edinburgh.)

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Charles F. Kutscher Jana B. Milford Frank Kreith

 CRC Press
Taylor & Francis Group

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