

Original Paper

A Study on the Determination of Liability Proportions for Property Damage in Ship Collisions

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Abstract

In maritime judicial practice, determining the proportion of liability for property damage resulting from vessel collisions remains a critical challenge. Although China's Maritime Code establishes the fundamental principle of "liability proportionate to the degree of fault," it lacks operational quantitative standards and a scientific fault classification system. This deficiency leads to significant variations in judicial rulings for similar cases, undermining the uniformity and fairness of legal application. This paper examines the determination of liability ratios for property damage resulting from vessel collisions, aiming to explore the theoretical foundations and practical approaches for liability apportionment and provide insights for refining China's relevant regulations. The study first traces the evolution of the concept of vessel collision, clarifying the rationale for China's legislation to include indirect collisions within its scope of regulation. Second, it delves into two core issues in China's liability proportion determination while examining extraterritorial practices in shipping-developed nations like the UK and the US, offering valuable insights for institutional refinement. Building on this analysis, the paper proposes three improvement recommendations: establishing quantitative reference standards for negligence, adhering to objective negligence assessment criteria, and adopting a navigation-stage analysis approach for adjudication.

Keywords

ship collision, property damage, liability ratio, determination of negligence

1. The Concept of Ship Collision

From international conventions to domestic legislation, and from traditional theories to modern perspectives, the concept of ship collision has undergone continuous evolution and development. This concept not only influences the application of law but is also closely intertwined with the system of property damage compensation in ship collision cases.

Article 1 of the 1910 Collision Convention clearly defines its scope of application: “Where a collision occurs between seagoing vessels, or between a seagoing vessel and an inland waterway vessel, resulting in damage to the vessel itself or to persons or property on board, the matters relating to compensation for such damage shall be determined in accordance with the subsequent provisions, regardless of the waters in which the accident occurred.” This definition emphasizes actual contact between vessels and consequential damage, limiting collisions to occurrences between seagoing vessels or between a seagoing vessel and an inland waterway vessel. Article 13 further extends the scope to cover situations where, although no actual contact occurred, loss or damage to another vessel, its cargo, or persons on board resulted from an act or omission of the vessel or a violation of navigation rules. This effectively broadens the scope of maritime collisions to include indirect collisions. The 1987 Draft International Convention on Compensation for Collision Damage to Ships (hereinafter referred to as the Lisbon Rules), drafted by the International Maritime Committee (CMI), explicitly incorporated indirect collisions and proposed a new definition (Pan, Y., 2013, pp. 16-19). Definition 1 characterizes a collision as any incident between vessels resulting in loss or damage, even if no actual contact occurs. Definition 2 states: a collision is an interaction between two or more vessels, caused by the negligence of one or more vessels, leading to loss or damage, regardless of whether actual contact exists. Article 13 of the Convention further clarifies: If a vessel causes damage to another vessel or to goods or persons on board another vessel by performing or failing to perform a maneuver, or by violating navigation rules, the provisions of this Convention shall apply to the compensation for such damage (Qu, T., 2012, pp. 34-43), even if no collision actually occurred. Compared to the 1910 Collision Convention, the Lisbon Rules no longer require actual contact as an essential element for determining a collision. They broaden the scope and definition of a collision, emphasize the role of negligence in collision determinations, and make the concept of collision more adaptable to the development of modern shipping. However, as of now, the Lisbon Rules are not legally binding on nations and therefore cannot replace the status of the 1910 Collision Convention.

Article 843 of the Korean Commercial Code provides that “the provisions of this Chapter shall apply to compensation for damage to vessels, goods on board, or persons in the event of a collision between seagoing vessels or between a seagoing vessel and an inland waterway vessel occurring in any waters,” thereby excluding collisions involving non-vessel facilities and inland waterway vessels. Although the Netherlands is a signatory to the 1910 Collision Convention, its definition of ship collision in the Maritime Code extends beyond the scope of the Convention. Article 534 stipulates that this chapter applies to loss of ships, property on board, or personal injury or death resulting from collisions between seagoing vessels. The term “collision” specifically refers to the impact or contact between ships. Furthermore, Article 544 clarifies that this chapter also applies where, without an actual collision, damage is caused to another vessel or its persons or goods due to improper navigation or violation of statutory rules. This establishes that the core criterion for determining a collision is liability, not physical contact. Some scholars note that the Dutch model reconstructs collision law as a special tort,

using negligence as the anchor to integrate diverse damage scenarios. Similar legislative provisions exist in the maritime laws of Germany, Italy, Norway, and other countries, though their definitions differ: Section 738(b) of the German Maritime Code defines it as “indirect damage”; Article 488 of the Italian Maritime Code defines it as “losses not caused by actual collision”; while Section 163 of the Norwegian Maritime Code directly defines it as “non-contact collision.”

China’s Maritime Code defines the concept of a ship collision by drawing upon relevant provisions of international conventions and incorporating specific regulations tailored to domestic circumstances. Article 165 of the Maritime Code stipulates: “A ship collision refers to an incident occurring at sea or in navigable waters connected to the sea where contact between vessels results in damage.” This definition establishes four essential elements for a collision: First, actual contact must occur; second, the incident must involve vessels; third, actual damage must result; and fourth, at least one party involved must fall within the definition of a vessel under Article 3 of the Maritime Code. In short, the concept of collision in China’s legislation does not encompass indirect collision. However, Article 170 further stipulates: “Where a vessel, through operational error or violation of navigation regulations, causes loss to another vessel or its persons, cargo, or property without actual contact, such circumstances shall still be handled in accordance with the provisions of this chapter” (Guo, H. L., 2009, pp. 39-41). This provision is essentially identical to Article 13 of the 1910 Collision Convention, indicating that Chinese legislation does not intend to exclude indirect collisions. Article 16 of the Compensation Regulations issued by the Supreme People’s Court in 1995 stipulates: An incident occurring at sea or in navigable waters connected to the sea, involving two or more vessels, constitutes a collision regardless of whether direct contact occurred, provided it results in property damage (Wang, C. Z., 2009, p. 116). This provision consolidated the definition of ship collision, encompassing both actual contact and non-contact scenarios. While this adjustment did not alter the fundamental nature of ship collision, it modified the conceptual framework. It also overlooked a crucial distinction: collisions involving actual contact do not necessarily require negligence as an element, whereas non-contact collisions inherently involve negligence. Recognizing these two distinct forms of collision facilitates their application in judicial practice (Wang, H. M., 2007, pp. 186-196). Article 1 of the 2001 “Provisions of the Supreme People’s Court on the Scope of Cases Accepted by Maritime Courts” also stipulates: “Cases involving compensation for collision damage to vessels shall include disputes over compensation for indirect collision damage, such as damage caused by waves.” Notably, Chinese legal scholars have questioned the term “indirect collision,” arguing that the distinction between direct and indirect collisions lacks scientific basis. Scholars represented by Professor Si Yuzhuo contend that Article 170 of China’s Maritime Code and relevant provisions in the Lisbon Rules indicate that classifying indirect collisions within the legal category of ship collisions better aligns with modern maritime practice. Other scholars, however, interpret the English term “collision” to refer exclusively to physical contact between vessels, emphasizing the necessity of actual contact between ships. They contend that the concept of direct versus indirect contact does not exist in relation to vessels themselves.

Furthermore, neither China's current legal provisions nor relevant international treaties on ship collisions have ever used the term "indirect collision." Japanese scholars Nakamura Masumi and Hakoi Takashi similarly contend that, based on common sense, a ship collision refers to the contact between two vessels on the water surface.

2. Issues in Determining Liability Proportions for Property Damage in Ship Collisions

2.1 The Determination of Liability Proportions Lacks Quantitative Standards

In ship collisions, fault serves as a necessary condition for damages and constitutes a crucial basis for establishing tort liability. Fault encompasses both intent and negligence. China's current Maritime Code provides only a general principle that "liability shall be borne in proportion to the degree of fault," yet lacks operational details for determining the specific proportion of fault. Crucially, it offers no clear quantitative standards or detailed assessment methods for defining the degree of fault or matching fault with liability proportions. Lord Wright noted in *The MacGregor* case that "the apportionment of liability in ship collisions is an art rather than a science. When both vessels have breached the rules, it is necessary to determine whose fault more directly caused the collision—this is akin to locating a mark on a gray spectrum." This process requires judges to exercise professional judgment in weighing multiple factors rather than mechanically determining facts. Such principled provisions grant judges a degree of discretion, and differing perspectives may arise among individuals. In judicial practice, disputes arising from vessel collisions continue to follow the general rules of evidence under the Civil Procedure Law, namely "the burden of proof lies with the party making the claim," with no special exceptions. Following an incident, maritime authorities typically conduct prompt on-site investigations, resulting in a Marine Accident Investigation Report and a Maritime Liability Determination. Statistical data indicates that while parties to litigation generally provide the accident investigation report and maritime liability determination—which serve as the basis for apportioning collision liability—AIS/VIS data is mostly proactively obtained by the court. Since navigation logs or liner logs are typically retained by the parties themselves, their originality and authenticity inevitably carry risks of alteration. Judges often make comprehensive judgments based on these factors, leading to significant variations among courts in determining "equal negligence" or "predominant negligence."

Academic circles propose three theories regarding the determination of fault proportion: the degree-of-fault priority theory, the causal force priority theory, and the comprehensive assessment theory. The degree-of-fault priority theory advocates using the subjective degree of fault as the criterion, dividing liability proportions based on whether the maritime operation involved gross negligence or ordinary negligence. The Causal Contribution Priority Theory emphasizes the actual degree to which negligent acts contributed to the collision outcome. Simply put, excessive speed in a collision carries greater causal weight than inadequate lookout. Under this theory, the degree of fault only affects liability establishment, not the specific proportion. The Comprehensive Assessment

Theory suggests a holistic evaluation considering fault severity, causal contribution, maritime customs, and industry standards. In current practice, the comprehensive assessment approach is generally adopted, though no specific quantitative model has been proposed, making implementation challenging. Collision cases often involve highly specialized maritime technologies and operational standards, yet relevant legal provisions are frequently formulated in broad terms, failing to adequately cover or clarify these technical details. For instance, laws only provide general principles regarding collision avoidance rules and the determination of safe speeds that vessels should follow during navigation. In specific cases, differing interpretations and applications of these provisions by parties create significant challenges for judges in determining fault proportions. Moreover, the absence of clear legal guidance forces judges to rely on their own understanding and experience of maritime knowledge, inevitably increasing subjectivity and uncertainty in determinations. Such subjective judgments may lead to unreasonable liability allocations that fail to accurately reflect the actual degree of fault of each party in the collision incident. With the rapid development of the shipping industry, the complexity of vessel collision incidents continues to increase, and new technologies and operational models are constantly emerging. However, China's Maritime Code has failed to keep pace with these industry developments, lacking clear standards for determining liability in novel collision scenarios and assessing varying degrees of fault. This disconnect between legislation and practice presents greater challenges for judges handling new types of collision cases, making it difficult to accurately determine fault proportions and allocate liability.

2.2 Lack of a Scientifically Sound Fault Classification System

Article 4 of the 1910 Collision Convention explicitly stipulates that vessels with mutual fault shall bear liability in proportion to their respective degrees of fault; where such proportion cannot be determined, liability shall be shared equally. In 1823, Lord Chief Justice Stowell of England established the fundamental definition of crew negligence in *The Dundee* case: "failure to exercise the care and vigilance necessary to ensure the safety of other vessels in the same waters." Such negligence, though not intentional, constitutes the legal cause of collision damage. Maritime law characterizes this as a breach of professional duty, explicitly stating that "no extraordinary skill or exceptional vigilance is required of seafarers; only the reasonable level of technical competence and caution expected of the profession under normal circumstances" serves as the general standard for determining crew negligence. Due to the dynamic nature of navigational environments and the specialized nature of vessel operations, collision incidents often involve multiple negligent acts, such as failure to maintain proper lookout, failure to maintain a safe speed, or violation of collision avoidance rules. Each negligent act contributes differently to the collision's occurrence, necessitating scientific assessment and quantification of the nature and severity of such acts when allocating liability. However, China's current Maritime Code and related judicial interpretations have yet to establish a comprehensive negligence evaluation system, resulting in inconsistent standards for determining negligent acts in judicial practice (Wang, H. M., 2007, pp. 186-196).

Theoretically, negligence in vessel collisions can be categorized into “gross negligence,” “ordinary negligence,” and “slight negligence.” However, defining these categories remains problematic. For instance, does intentionally violating navigation rules or refusing to comply with traffic control instructions—acts involving significant subjective malice—constitute gross negligence? What criteria distinguish ordinary negligence from slight negligence? In judicial practice, cases are often resolved through “equal apportionment” or “presumptions based on experience.” This subjective discretion can lead to wildly divergent outcomes in similar cases, severely undermining judicial credibility. In principle, the proportion of negligence should correlate positively with the proportion of liability. However, the absence of graded standards makes it difficult for courts to establish corresponding models. Consequently, judicial authorities must invest significant time and effort analyzing the specifics of each case when determining liability ratios. This necessitates judges meticulously evaluating vast amounts of nautical technical data and evidence to determine each party’s degree of negligence—a process that is both cumbersome and time-consuming. Moreover, judges in different regions and courts may reach divergent conclusions when handling similar vessel collision cases due to the absence of uniform negligence grading standards, relying instead on their individual judgments. This inconsistency in legal application not only undermines the authority of the law but also creates opportunities for parties to strategically choose courts favorable to their interests, further exacerbating inequities in judicial practice. Establishing a scientific negligence grading system that clearly defines how different types and degrees of negligent conduct impact liability ratios has become one of the most pressing issues requiring resolution in the ongoing refinement of China’s maritime law.

3. Overseas Practice Study and Experience Reference

As a global shipping hub and the birthplace of the common law system, the United Kingdom has developed a mature framework in the field of collision damages, where case law and statutory law complement each other. Therefore, when discussing the evolution of property damage compensation in maritime collisions, insights may be gleaned from the UK’s developmental trajectory. A series of historical and modern landmark cases from the UK’s Admiralty Court provide crucial interpretations for understanding collision avoidance rules, negligence, causation, and the principle of apportionment of loss. The principles of fairness embodied in these rulings and the wisdom demonstrated by judges remain valuable references to this day. Following the 16th century, the handling of ship collision cases primarily revolved around loss apportionment. The early period widely adopted the “equal division principle,” whereby losses were shared equally between the parties regardless of fault. Additionally, in *Hay v. Le Neve*, regarding whether Hay should pay Le Neve two-thirds or one-half of the losses, Judge Lushington ruled that one-half should be paid. In the *Milan* case, Judge Lushington also held that if the collision resulted from the negligence of both vessels, the cargo owner could only claim half of the losses from the non-cargo-carrying vessel. Through a series of landmark precedents, British courts have progressively refined the interpretation and application of the 1972 International Regulations for

Preventing Collisions at Sea. For instance, in the 1977 case of *The Estrella*, Judge Brandon explicitly stated that deviation during the free-running phase generally does not constitute a cause of collision, as no other vessels were present at that time and the vessel could have entirely avoided the collision by complying with the 1972 International Regulations for Preventing Collisions at Sea. This ruling established the standard for determining causation between negligent acts during the free-running phase and collision outcomes. In the 1998 case of *The Ouro Fino*, the court conducted a more detailed analysis of fault attribution for an anchored vessel: *The Ouro Fino* bore 60% liability for the collision due to improper anchorage selection, failure to display anchor lights, and inadequate lookout, while the underway vessel *Rimac* bore 40% liability for failing to maintain a proper lookout. In recent years, the High Court of Justice in the United Kingdom has demonstrated a high degree of specialization in its maritime collision case law. In the 2025 *Monford Management Ltd v. Afina Navigation Ltd* case, the court conducted an in-depth analysis of the application of Rules 14 and 15 of the 1972 International Regulations for Preventing Collisions at Sea, emphasizing that the criterion for determining an encounter situation is “when one vessel can see the other vessel’s mastlight in a straight line or simultaneously see both side lights.” Another distinctive feature of English law is the rejection of traditional rules such as the “last chance principle,” which held that a party failing to avoid a collision when presented with the final opportunity bore full liability. This principle has been superseded by the comparative fault principle established under the 1910 Collision Convention.

Although the United States did not accede to the 1910 Collision Convention, it has shifted from the traditional “equal fault principle” to the “proportional fault principle” in allocating collision liability. Prior to 1975, the U.S. long adhered to the “equal fault principle” originating from British common law, whereby damages were equally shared by both parties whenever mutual fault existed in a collision, regardless of the degree of fault attributed to each. The theoretical foundation of this principle lies in the concept of “equity”—since both parties are at fault, it is difficult for the law to precisely allocate the extent of each party’s liability, and having both parties bear the losses equally is a relatively fair choice. However, the shortcomings of this rule are evident: in cases where one party’s fault is overwhelmingly predominant and the other’s is merely incidental, requiring the primarily at-fault party and the secondarily at-fault party to bear equal liability severely deviates from the fault-based liability principle of tort law. As some scholars have pointed out, the equal apportionment principle “fails to examine the causal relationship between fault and collision outcomes, often allowing vessels that committed fault in earlier stages to evade collision liability under this principle” (Han, L. X., & Wang, X. F. (Eds.), 2003). Following the 1975 *Reliable Transfer* case, the U.S. Supreme Court established the principle of comparative negligence, requiring courts to apportion liability proportionally based on the degree of fault attributable to each party. In that case, the defendant vessel *Reliable Transfer* ran aground. With the shipowner arguing the grounding resulted from the Coast Guard’s failure to maintain adequate lighting on the breakwater. The Coast Guard, however, contended the grounding was entirely the shipowner’s fault. The district court found both parties at fault but, under the then-prevailing doctrine

of equal apportionment of fault, ordered them to share the losses equally. When reviewing this case, the U.S. Supreme Court systematically reexamined the doctrine of equal apportionment. Ultimately, by an 8-1 majority, it overturned this traditional rule and established a new principle of allocating liability proportionally based on fault. In its reasoning, the Court stated: “When both parties are at fault, apportioning losses according to their respective degrees of fault is fairer and more reasonable than the traditional equal-share rule...” The equal-share rule contradicts the fundamental principle of tort law that a party should bear liability commensurate with the degree of their fault. In the 1979 case *Alamo Chemical Transportation Co. v. Overseas Valdes*, the court further clarified that non-carrier vessels are only liable to cargo owners for collision damages in proportion to their degree of fault. This shift aligned U.S. law with the prevailing international practice established by the 1910 Collision Convention.

In determining negligence, U.S. law has developed the distinctive “Pennsylvania Principle.” This principle originated from the 1874 U.S. Supreme Court case involving the collision of the steamship *Pennsylvania*. In that case, the court established a strict presumption of fault: if a vessel violated statutory navigation rules or other relevant regulations, it was presumed that the violation caused the collision, unless the offending party could prove that its actions “could not have caused the collision and in fact did not cause it.” The Pennsylvania Principle essentially constitutes a legal presumption of fault, its severity manifested in the reversal of the burden of proof and the exceptionally high standard of proof required. The offending party must demonstrate that its violation “could not have been” the cause of the collision—a standard so stringent it is practically impossible to meet. The legislative purpose of this principle is to enforce strict compliance with navigation rules through a rigorous liability regime, thereby minimizing collision incidents to the greatest extent possible. However, this principle conflicts with Article 6 of the 1910 Collision Convention, which states that “all legal presumptions of fault in connection with collision shall be abolished.” As legal presumptions of fault have been abolished worldwide, the Pennsylvania Rule has faced increasing criticism. Scholars argue that the rule disregards the causal link between the violation and the collision, imposing an unduly heavy burden of proof on the violating party, which may lead to misallocation of liability. Nevertheless, as the United States has not acceded to the 1910 Collision Convention, this principle remains dominant in American judicial practice. Since the 1975 *Reliable Transfer* case established the doctrine of comparative negligence, however, application of the Pennsylvania principle has moderated. Courts now exercise greater caution in specific cases, carefully examining the actual causal relationship between the violation and the collision outcome.

The evolution of U.S. maritime law from “equal apportionment of fault” to “proportional fault” warrants careful consideration. While Article 169 of China’s Maritime Code has established the principle of proportional fault, its practical application requires further refinement. Drawing insights from the U.S. case of *Reliable Transfer*, determining the proportion of fault should comprehensively consider two factors: first, the blameworthiness of the conduct, namely whether it violated navigation

rules; second, the degree of causation of the conduct on the collision outcome. As scholars Zhao Yuelin and Zhang Zhiyong stated: “When determining the degree of fault, both the severity of the misconduct and its causal effect on the damage must be considered—neither can be neglected.” Simply put, courts cannot merely count which party made more mistakes; they must determine whose fault was the primary cause of the collision. This judicial philosophy was already reflected in China’s adjudication of the “Reliable Transfer v. CS Marine Co., Ltd.” case. In that case, the adjudicating court did not confine itself to the apparent fact that both parties had obvious faults, but instead adopted a more refined adjudication approach: the “navigation phase analysis method.” The court divided the entire sequence from the vessels’ encounter to the collision into several consecutive phases, systematically examining whether the navigational actions of both ships in each phase complied with the 1972 International Regulations for Preventing Collisions at Sea and relevant standards of good seamanship. Through this phased, dynamic reconstruction, the court precisely identified that although both parties had committed negligence in the early stages—such as failing to maintain proper lookout and not using safe speed—the imminent danger that ultimately led to the collision was directly caused by one party’s critical maneuvering error at a pivotal moment. Based on this, the court ruled that party bore primary responsibility for the collision. The court’s reasoning broke from the traditional approach of treating “negligence” as a broad, static concept, instead establishing an examination model centered on “temporal sequence” and “causal force.”

The aforementioned extraterritorial practices, particularly the dual-dimensional assessment criteria in the United Kingdom and the evolution of comparative negligence in the United States, offer valuable insights for China in establishing quantifiable negligence standards and introducing the navigation phase analysis method. Building upon this foundation, the following section proposes pathways for refining China’s rules for determining liability proportions.

4. Proposals for Improving the Rules for Determining Liability Proportions in Ship Collisions in China

4.1 Establish a Reference Standard for Quantifying Negligence

In maritime collision cases, the assumption of civil liability fundamentally hinges on the existence of negligence. Without negligence, the basis for liability ceases to exist. Therefore, the primary step in establishing liability lies in determining negligence. Regarding the standard for measuring negligence, two primary approaches exist: the objective standard, which focuses on what a reasonable person “should have foreseen” under specific circumstances, unaffected by individual differences in foresight; and the subjective standard, which emphasizes the actor’s actual capacity for foresight. Negligence is established if the party could have foreseen the harm but failed to do so, ultimately causing the damage. Reviewing legislation across nations and long-standing maritime judicial practice, the determination of negligence in vessel collisions generally adopts the objective standard. Specifically, it is based on the ability of a competent seafarer under identical conditions to foresee or prevent the occurrence of harm

and the expansion of its consequences. Zhao Yuelin and Zhang Zhiyong propose that when apportioning liability for damages in ship collision cases, the Anglo-American “two-part approach” may be adopted: First, based on the theory of proximate causation, analyze the contributory effect of each negligent act occurring before and during the collision to determine its factual impact on triggering the accident and exacerbating the damage; Second, the legal connection between conduct and damage is assessed by integrating the doctrine of direct consequence with the foreseeability rule. British courts have developed a relatively mature standard for quantifying negligence through long-standing case law practice. In *Monford Management Ltd v Afina Navigation Ltd*, Judge Bryan explicitly stated that under Section 187 of the Merchant Shipping Act 1995, liability assessment requires a comprehensive consideration of the “blameworthiness” and “causal efficacy” of both vessels, as well as the relative degree of responsibility attributable to each. This signifies that fault quantification constitutes a multidimensional assessment process. In *The Nordlake and Sea Eagle*, Judge Teare systematically elaborated the principles of fault quantification: First, the quantity of faults is not decisive. “You should not count the number of faults. Quantity is not decisive. What matters is the nature and quality of the faults, which must be assessed through the two elements of fault—causal efficacy and blameworthiness.” This principle corrects the simplistic tendency to “count the number of faults” rather than “measure the magnitude of causation” (Nakamura Masumi and Hakoi Takashi: *Japanese Maritime Commercial Law*, translated by Zhang Xiujuan, Li Gang, and Park Xin. Beijing: China Law Press; 2015). Second, causation operates on two levels. “The first level concerns the degree to which negligence contributed to the occurrence of the collision; the second level concerns the degree to which negligence contributed to the damages or losses resulting from the collision.” This distinction is significant: a particular act of negligence may have played a minor role in causing the collision itself, yet significantly exacerbated the resulting harm. Third, vessels that create dangerous situations generally bear greater responsibility. “The causal effect of a vessel failing to react to a dangerous situation created by another vessel is generally considered less than that of the vessel creating the situation.” This principle was demonstrated in the case of *Rickmers Genua against CS Marine Co., Ltd.*, where the court determined that the R vessel’s erroneous turn in the final stage was the direct cause of the collision, thereby bearing greater liability. Fourth, intentional conduct is generally more blameworthy than negligent conduct. “The fault of intentional acts or omissions may, under specific circumstances, be deemed more blameworthy than fault arising solely from negligence.” This principle reflects consideration of the degree of subjective culpability.

China’s maritime courts have developed a relatively mature approach to quantifying negligence through long-term judicial practice. In her analysis of the “Anjieli 18” case, Judge Wu Xia of the Nanjing Maritime Court proposed that determining the proportion of liability in a vessel collision should follow this analytical path: The primary step is defining the vessels’ encounter situation. The position of a vessel within a specific encounter pattern directly determines its role—whether it is the oncoming vessel, the yielding vessel, or whether both parties bear equal obligations to avoid collision.

In this case, the court comprehensively analyzed AIS and SVDR data to determine that the vessels were in a wide-angle crossing encounter. The “ZHONG JIAN” was the on-course vessel, while the “Anjieli 18” was the yielding vessel. This determination directly established the foundation for collision avoidance liability. Secondly, the vessels’ negligent conduct must be analyzed in phases. The sequence from vessel encounter to collision can be divided into stages: free action, creation of collision risk, formation of a close situation, and creation of imminent danger. The influence of negligent conduct on the collision accident exhibits a gradient distribution across these stages: negligence causing the close situation had the most significant impact, negligence leading to imminent danger was next in severity, negligence occurring after imminent danger was formed had a relatively minor effect, while negligence triggering collision risk had the weakest influence. Finally, the degree of negligence and causal efficacy were comprehensively analyzed. The MV Angel 18, as the yielding vessel, failed to fulfill its duty to give way promptly and adequately to the oncoming vessel throughout the encounter. It was thus determined to bear primary responsibility, assuming 70% of the losses. The other vessel, the MV ZHONG JIAN, made an improper left turn after the imminent danger had developed and was held liable for 30% of the damages. This ruling reflects a precise assessment of the causal efficacy of negligent conduct.

Based on foreign experience and China’s judicial practice, the following reference standards for quantifying negligence can be established: First, weighting of negligent acts. Different weighting coefficients may be assigned based on the magnitude of each negligent act’s contribution to the collision outcome. Second, quantitative classification of negligence levels. As stated in the Maritime Law, judicial practice uses 5% as the minimum unit for measuring the proportion of negligence attributed to colliding vessels. If a vessel’s negligence proportion reaches or exceeds 55%, it bears primary responsibility; otherwise, it bears secondary responsibility. Third, a multi-factor comprehensive assessment model. Recent academic research has attempted to integrate quantitative standards with intelligent technologies. Some scholars have proposed a collision liability allocation method based on ontology models and Bayesian networks. This approach utilizes an improved Apriori algorithm to extract strong association rules from 241 maritime investigation reports, constructing a vessel collision fault ontology. This ontology is then mapped to a Bayesian network to achieve probabilistic liability allocation.

4.2 The Determination of Negligence Should Adhere To Objective Standards

Regarding the determination of negligence, foreign judicial practices have developed a comprehensive system of rules. The objective negligence theory has become the prevailing view, which establishes negligence based on externally observable objective facts. Negligence is deemed established whenever conduct violates the 1972 International Regulations for Preventing Collisions at Sea or the requirements of good seamanship, without requiring examination of the actor’s subjective mental state. British case law offers particularly detailed interpretations of collision regulations. In *The Estrella*, Judge Brandon established the rule that negligent acts during the free-maneuvering phase generally do

not constitute the cause of a collision. In *The Ouro Fino*, the court conducted a detailed analysis of the proportion of fault between an anchored vessel and a moving vessel. Regarding specific standards of liability, various special rules have emerged in international practice: The strict presumption of fault established by the Pennsylvania Doctrine in the United States, though increasingly marginalized internationally due to its excessive rigor, still holds positive significance in promoting seafarers' compliance with navigation rules through its underlying principle of "presumption of fault upon violation of rules." The principle of fault in emergencies reflects the legal value of "not imposing unreasonable demands on individuals." A vessel caught in an emergency due to another vessel's fault is not liable for damages even if it takes erroneous actions. The "equivalent negligence principle" applies when both parties are at fault and either party's negligence alone could have caused the collision, resulting in each bearing 50% liability. This principle is already embodied in Article 169 of China's Maritime Code. China should continue adhering to the objective fault determination standard centered on the 1972 International Regulations for Preventing Collisions at Sea. Drawing on British case law experience, navigation should be divided into distinct phases—free maneuvering, collision risk, urgent situation, and imminent danger—with fault assessed separately for each phase. For rule violations, causal links to collisions must be established, avoiding simplistic presumptions. Simultaneously, special rules such as equivalent negligence in emergencies should be comprehensively applied and flexibly adapted to the circumstances of each case.

4.3 Determining the Decision Path for the Navigation Phase Analysis Method

A ship collision is a dynamic process that progresses from distant approach to actual contact, with negligent acts exerting significantly different forces on the collision outcome at different stages. Judge Shi Zhen pointed out that determining negligence in a ship collision requires "dividing the entire collision process into distinct navigational phases: encounter, formation of a close-quarters situation, and collision. At each phase, analysis must be conducted against the standards of good seamanship and the rules for preventing collisions at sea to determine whether collision negligence exists." This "phase-based analysis method" has become a crucial adjudication approach in maritime judicial practice. The process from vessel encounter to collision can generally be divided into the following four stages:

Phase One: Before a collision risk arises (phase of free maneuvering). At this stage, the two vessels are far apart. Even if their compass bearings remain consistent, the considerable distance allows each ship to independently determine its navigational actions. The 1972 International Regulations for Preventing Collisions at Sea impose fewer restrictions on vessel maneuvering, unless one vessel bears the duty "not to impede." Therefore, when both vessels are navigating autonomously, any maneuver by one vessel that violates the 1972 International Regulations for Preventing Collisions at Sea is neither the cause of the collision nor directly linked to the resulting damage. Even if a vessel violates the principle of "not to impede" principle, thereby creating a collision risk, the likelihood of collision can still be eliminated through subsequent evasive actions. Consequently, the impact of such negligence on the

collision damage is minimal at this stage.

Stage Two: From Collision Hazard to Imminent Collision Situation. When the DCPA (Distance to Closest Point of Approach) between two vessels is less than the safe passing distance, and the TCPA (Time to Closest Point of Approach) is short, a collision risk should be considered present. At this stage, there may be a situation where one vessel should give way, or both vessels may be required to fulfill equal collision avoidance duties. If each vessel takes appropriate action as required by the 1972 International Regulations for Preventing Collisions at Sea, the two vessels will pass at a safe distance. Conversely, if vessels approach to a point where a safe distance cannot be maintained by the actions of one party alone, a close-quarters situation arises. Once a close-quarters situation occurs, the risk of collision increases dramatically. The maneuver that brought the vessels into this close-quarters situation contributes most significantly to the cause of the accident and the resulting damage. Practical case law indicates that the party responsible for creating the close-quarters situation is often held primarily liable for the collision.

Stage Three: From a Close Approach to a Close Hazard. If two vessels are in a close approach, and one is under the duty to give way while the other has the right of way, the vessel under the duty to give way must immediately take evasive action. If the vessel proceeding on the right of way clearly observes that the vessel under the duty to give way has not taken compliant measures in accordance with the 1972 International Regulations for Preventing Collisions at Sea, it may independently take evasive action, but must employ professional seamanship when executing such maneuvers independently. Where the relationship between the yielding vessel and the right-of-way vessel is unclear, both vessels bear equal responsibility and obligation to avoid collision and should promptly take evasive action based on skilled navigation. When vessels face imminent danger, timely implementation of measures under the 1972 International Regulations for Preventing Collisions at Sea may avert the peril. Failure by either or both parties to execute collision avoidance actions will escalate the crisis, increasing the likelihood of collision. Once this stage is reached, the reduced separation between vessels limits decision-making time, decision-making time becomes limited, and the window for implementing collision avoidance measures narrows. The impact of actions causing imminent danger on the cause of the collision and the extent of damage is less significant than in the previous stage.

Stage Four: From Imminent Danger to Collision. According to the core principle of imminent danger, if an imminent danger situation arises between two vessels, and if both vessels can take the most appropriate evasive action, the possibility of avoiding collision still exists. However, if only one vessel acts independently or if the actions of both vessels are not synchronized, collision becomes inevitable. Once the imminent danger phase commences, the distance between vessels approaches a critical threshold, the situation becomes highly critical, and the probability of collision avoidance is extremely low. Consequently, the influence of each vessel's actions on the cause of the accident and the resulting damage is significantly diminished compared to earlier phases.

In summary, when determining liability ratios, we may proceed through the following approaches: First, identify the type of vessel encounter. According to the 1972 International Regulations for Preventing Collisions at Sea, vessel encounters are categorized into three fundamental situations: overtaking, meeting, and crossing. The applicable rules of avoidance are as follows: In overtaking situations, the overtaking vessel must give way to the overtaken vessel. In meeting situations, both vessels bear equal obligations to give way by keeping to starboard, without distinguishing between the overtaking vessel and the vessel proceeding ahead. In crossing situations, the vessel that sees the other vessel on its starboard side should give way. Second, analyze the vessel's negligent conduct in stages. The process from vessel encounter to collision can be divided into four phases: prior to collision danger (free action phase), from collision danger to imminent danger, from imminent danger to imminent peril, and from imminent peril to collision. Third, comprehensively evaluate the degree of fault and causal effect. When determining fault proportions, both the severity of the fault and its causal effect must be considered equally, without neglecting either. As one scholar aptly states: "In assessing the degree of fault, both the severity of the fault and its causal effect must be considered simultaneously, without neglecting either."

5. Conclusion

The core dilemma in determining liability ratios for vessel collisions in China lies in the fact that "the principle is clear, but the rules are lacking." Although Article 169 of the Maritime Code establishes the principle of apportioning liability based on fault, it lacks operational quantitative standards and a scientific fault grading system. This results in excessive judicial discretion in court practice, leading to significant discrepancies in rulings for similar cases. The tension between the universality of evidentiary rules and the specialized nature of ship collision cases further exacerbates the uncertainty in liability determination. At its core, this dilemma stems from a structural contradiction: legislation lags behind the evolution of shipping practices, and abstract principles struggle to accommodate complex individual cases. The dual-dimensional assessment standard of "blameworthiness" and "causal effect" developed through British case law reveals that quantifying fault is not merely a simple tally of errors, but a comprehensive weighing of the nature and impact of actions. The evolution in the United States from the "equal apportionment of fault" to the "proportional apportionment of fault" principle demonstrates the universal value of fault-based liability principles in maritime tort law. These experiences indicate that determining liability proportions requires striking a dynamic balance between rule certainty and case-specific flexibility. In summary, refining China's rules for determining liability proportions in vessel collision cases should adhere to a dual-track approach of "quantitative guidance" and "stage analysis." On one hand, establish quantifiable reference standards for negligence, assigning corresponding weights based on the causal efficacy of negligent acts at different collision stages to provide judges with a "measuring scale" for discretion. On the other hand, adopt a navigational-stage analysis approach, dividing the collision process into phases such as free action, creation of collision

danger, formation of a tight situation, and creation of imminent danger, to assess the nature and force of negligent acts at each stage. Simultaneously, it upholds objective standards for negligence determination, using the 1972 International Regulations for Preventing Collisions at Sea and the requirements of good seamanship as the basis for judgment. It comprehensively applies special rules such as negligence in emergencies and equivalent negligence to achieve refined and scientific liability allocation. As vessels grow larger, navigation becomes more intelligent, and shipping becomes increasingly internationalized, the complexity of vessel collision accidents will continue to intensify. The revision of China's Maritime Code should fully incorporate beneficial experiences from judicial practice and draw upon the latest achievements in international maritime legislation. Mature rules such as quantitative standards and stage analysis methods should be elevated to statutory provisions while maintaining appropriate flexibility to reserve necessary discretion for judges. Furthermore, the Supreme People's Court may issue guiding cases and formulate judicial interpretations to unify adjudication standards and enhance the predictability of legal application.

References

- Guo, H. L. (2009). On the Liability Basis for Indirect Collisions between Vessels. *Tianjin Maritime*, 2009(01), 39-41.
- Han, L. X., & Wang, X. F. (Eds.). (2003). *Compilation of Maritime Commercial Laws of Various Countries (Regions) (Chinese-English Bilingual Edition)*. Dalian: Dalian Maritime University Press.
- Nakamura Masumi and Hakoi Takashi: Japanese Maritime Commercial Law, translated by Zhang Xiujuan, Li Gang, and Park Xin. Beijing: China Law Press; 2015.
- Pan, Y. (2013). Liability for Non-Contact Collisions Resulting from Voluntary Violations of Navigation Rules by Vessels. *Navigation*, 2013(05), 16-19.
- Qu, T. (2012). The Conceptual Definition of Ship Collision. *Chinese Maritime Law Review*, 23(03), 34-43.
- Si, Y. Z. (2018). *Special Topics in Maritime Commercial Law* (4th Edition, p. 268). Beijing: China Renmin University Press.
- Wang, C. Z. (2009). Research on the Concept of "Ship Collision". *Law and Society*, 2009(08), 116.
- Wang, H. M. (2007). On the Definition, Concept, and Liability of Ship Collisions. *China Maritime Law Yearbook*, 2007(00), 186-196.