國立臺灣海洋大學九十九學年度研究所碩士班暨碩士在職專班入學考試試題

考試科目： 英文閱讀

系所名稱： 商船學系碩士在職專班不分組

1.答案以橫式由左至右書寫。2.請依題號順序作答。

Part 1：

Please read the article and answer the following questions. (Q1-Q3). (20%)

The purpose of this paper is to analyse the significance of the human element in accidents involving Greek-flagged ships, during 1993-2006, worldwide. In this context, the human element as a general factor of accident initiation and most importantly its constituent components, in the form of specific onboard duties (functions) and/or off-board (mainly ashore) entities, were presented and analysed. It was found that 57.1% of all accidents were attributed to the human element, whereas 75.8% of the latter were detected onboard and 80.4% of the onboard human-induced accidents were linked to errors and violations of the ship's master. Furthermore, since the timeframe examined covers the implementation of the ISM Code, the current analysis was aimed at producing valuable information with regard to its effectiveness upon Greek shipping. In this respect, a 12.2% reduction of human-caused accidents has been found during the post-ISM period. Finally, the association between specific accident types and human element components was examined utilising the technique of correspondence analysis and it was found that groundings and collisions were closely related to the ship's Master, whereas mechanical failures and fires were associated with the engine officers, and cargo shifts and flooding with bridge officers.

(Excerpted from Tzannatos, E. (2010), "Human element and accidents in Greek shipping", *The Journal of Navigation*, vol. 63, pp. 119-127.)

(1) What is the objective of the paper? (A) Evaluation of the importance of the human element in the accidents of the vessels under the administration of Greece during 1993-2006 (B) Analysis of the positive influence of the ISM Code in the human element related accidents of Greek-flagged vessels during 1993-2006 (C) Presentation of the human element in accidents of Greek-flagged vessels between 1993 and 2006 (D) Evaluation of the significance of the human element in accidents involving Greek seafarer during 1993-2006 (6%)

(2) Which statement is true? (A) Two-third accidents of Greek-flagged vessels were attributed to human element. (B) Three quarters of the human element related accidents of Greek-flagged vessels resulted from onboard personnel. (C) Implementation of the ISM Code caused a two-tenth reduction in human-induced accidents for Greek-flagged vessels. (D) Groundings and collisions of Greek-flagged vessels were closely related to bridge officers. (6%)

(3) What does ISM stand for? (A) International Security Management (B) International Ship Maintenance (C) International Safety Management (D) International Survey Mechanism. (8%)

Part 2：

Please read the article and answer the following questions. (Q4-Q8). (30%)

Navigational collisions are one of the major safety concerns in many seaports. A number of researchers (Darbra and Casal, 2004; Liu, Liang et al., 2006; Liu, Pedersen et al., 2006; Yip, 2008) have reported that collisions account for a substantial portion of major shipping accidents in port waters. Furthermore, growth of shipping traffic over the past decades (Soares and Teixeira, 2001) is likely to result in increased traffic movements within port waters, which in turn could increase collision risk in such waters (Chin and Debnath, 2008). To assess navigational safety in port waters, traditionally researchers have relied on collision statistics. A number of studies have used this approach to examine trends and causes of collisions (Goossens and Glansdorp, 1998; Akten, 2004; Darbra and Casal, 2004; Liu, Liang et al., 2006) whereas some have examined consequences (i.e., injuries and fatalities) by using the statistics (Darbra and Casal, 2004; Yip, 2008).

The collision-based safety analysis approach is often hampered by several limitations. Firstly, to obtain statistically sound inferences from analysis of collision records it is necessary to have a database of a sufficiently large number of collisions. Since a long time period is required to obtain such a database, this approach is not suitable for short-term safety assessment, where, for example, there is a need to evaluate the effectiveness of a particular type of safety measure at a specific location. Moreover, in the case of assessing safety in a particular location the sample size (i.e., number of collisions in that location) becomes even smaller, and thus it becomes more difficult to obtain statistical soundness in results. This may explain why statistical significances are not reported in many studies (e.g., Darbra and Casal, 2004; Liu, Liang et al., 2006). The low sample problem also restricts safety analysts from using robust statistical methods, such as regression techniques. Secondly, collision is an outcome of a complex process of interaction involving vessels, pilots, crews, port operators and marine environment. Therefore, it is sometimes difficult to investigate the main causes of collisions just from the numbers of the outcome (i.e., collision) of the process. Finally, this approach to safety analysis is often criticized by many researchers (e.g., Chin and Quek, 1997; Debnath and Chin, 2006; Songchitruksa and Tarko, 2006) as reactive and unethical as it requires sufficiently large number of collisions to take place first, before any preventive or corrective measures are taken.

A promising alternative that overcomes the limitations of the collision-based safety analysis approach is safety analysis using surrogate safety measures, where safety is assessed by analyzing critical vessel interactions or conflicts. This surrogate safety analysis concept was primarily developed in the context of road traffic, and has been employed in numerous studies (see Chin and Quek, 1997). However, it is yet to be comprehensively implemented in navigational safety

assessment. In an earlier paper (Debnath and Chin, 2006) we proposed this concept for navigational safety assessment purpose and discussed its suitability to navigational safety research. We contended that it has great potential to extract meaningful inferences from short-term safety analyses. The key advantage of this safety analysis approach is having a larger database within a shorter period of time as navigational traffic conflicts occur considerably more frequently than collisions. Therefore, it is possible to obtain statistically sound inferences by analyzing conflicts of a significantly shorter time period. The surrogate safety analysis approach also solves the ethical problem of collision-based analysis (i.e., reactive approach) by investigating safety deficiencies proactively. Thus, this approach of safety analysis is an ethically appealing alternative to the traditional approach for fast, reliable and effective safety assessment.

This paper aims to develop an innovative navigational traffic conflict technique (NTCT) for quantitative measurement of collision risks in port waters by employing surrogate safety measures. Two such measures indicating vessels' spatial and temporal proximity are used to measure conflicts quantitatively. By using the measured conflicts, a method is developed for measurement of collision risks in port waters. This methodology is illustrated and validated for fairways in Singapore port. The NTCT, its illustration and validation are presented in subsequent sections.

(Excerpted from Debnath, A. K. and Chin, H. C. (2010), "Navigational Traffic Conflict Technique: A Proactive Approach to Quantitative Measurement of Collision Risks in Port Waters", *The Journal of Navigation*, vol. 63, pp. 137-152.)

(4) According to the paper, under which circumstances can the collision-based safety analysis approach be particularly useful? (A) where the data is scarce (B) where a database has been established (C) where a few samples have been collected (D) where the data does not exist (6%)

(5) Which statement is NOT the criticism for the collision-based safety analysis approach? (A) The approach is incapable of evaluating the effectiveness of a certain type of safety measures at a specific location. (B) Some of the studies based on such an approach do not address the statistical significance of the results. (C) The approach is regarded as a reactive technique. (D) The approach is proven to be effective in situations where the sample size of the collisions is large (6%)

(6) Which two paragraphs discuss the necessity of conducting this research? (A) Paragraphs 1&2 (B) Paragraphs 2&3 (C) Paragraphs 3&4 (D) Paragraphs 1&4 (6%)

(7) What is the meaning of "surrogate"? (A) proactive (B) quantitative (C) substitute (D) innovative (6%)

(8) What is the objective of this paper? (A) Development of a new approach overcoming the

problem of the low number of observations for navigational safety analysis (B) Discussion of the strengths of the traditional studies based on the collision-based safety analysis approach (C) Collisions being the only one concern for navigational safety (D) Analysis of the shortcomings of the collision-based safety approach (6%)

Part 3：

Please read the article below and complete the sentences with words taken from the text. Please Use NO MORE THAN THREE WORDS for each answer (Q9-Q15) (30%).

The Fordist era can be epitomized by the adoption of the assembly line as the dominant form of industrial production. The core innovation was the internal combustion engine, or four-stroke engine, which was a modified version of the diesel engine by Daimler (1889). As compared with steam engines, internal combustion engines have a much higher efficiency and use a lighter fuel, petrol. Petrol, initially perceived as an unwanted by-product of the oil refining process, intended to develop kerosene for illumination, became a convenient fuel. Initially, diesel engines were bulky, limiting their use to industrial and maritime propulsion, a purpose which they still fulfill today. The internal combustion engine permitted an extended flexibility of movement with fast, inexpensive, and ubiquitous (door to door) transport modes such as cars, buses, and trucks. Mass producing these vehicles considerably changed the industrial production system, notably from 1913 when Ford began the production of the Model T car on an assembly line. From 1913 to 1927, about 14 million Ford Model T were built, making it the second most enduring car in the production line, behind the Volkswagen Beatle. The rapid diffusion of the automobile marked an increased demand for oil products and other raw materials such as steel and rubber.

With economies of scale, freight transportation was able to move low-cost bulk commodities such as minerals and grain over long distances. Oil tankers are a good example of the application of this principle to transport larger quantities at a lower cost, especially after WWII. Maritime routes were expanded to include tanker routes, notably from the Middle East, the dominant global producer of oil. In the 1960s, tanker ships of 100,000 tons became available, to be supplanted by VLCCs (Very Large Crude Carrier) of 550,000 tons at the beginning of the 1980s. A ship of 550,000 tons is able to transport 3.5 million tons of oil annually between the Persian Gulf and Western Europe.

The first balloon flight took place in 1783, but due to the lack of propulsion no practical applications of air travel were realized until the 20th century. The first propelled flight was made in 1903 by the Wright brothers and this inaugurated the era of air transportation. Air transport rapidly grew with the introduction of new postal and passengers services. 1919 marked the first commercial air transport service between England and France. The 1920s and 1930s saw the expansion of regional and national air transport services in Europe and the United States with successful propeller aircraft such as the Douglas DC-3. The post World War II period was however the turning

point for air transportation as the range, capacity and speed of aircraft increased as well as the average income of the passengers. A growing number of people were thus able to afford the speed and convenience of air transportation. In 1958, the first commercial jet plane, the Boeing 707, entered service and revolutionized international movement of passengers, marking the end of passenger transoceanic ships.

Basic telecommunication infrastructure, such as the telephone and the radio, were mass marketed during the Fordist era. However, the major change was the large diffusion of the automobile, especially from the 1950s. No other modes of transportation have so drastically changed lifestyles and the structure of cities, notably for developed countries. It created suburbanization and in some instances expanded cities to areas larger than 100km in diameter. In dense and productive regions, such as the Northeast of the United States, the urban system became structured and interconnected by transport networks to the point that it could be considered as one vast urban region- a megalopolis.

(9) Until 1927, approximately _____ Model Ts were produced. (3%)

(10) Oil tankers used _____ to transport oil at a substantially lower cost. (5%)

(11) The balloon's lack of propulsion meant that no one could think of _____ for air travel. (5%)

(12) In 1903, the Wright brothers heralded a new era of _____. (5%)

(13) English-France commercial flights began in _____. (2%)

(14) European and American aviation developed through new propeller planes like the _____. (5%)

(15) Passenger flight was revolutionized by the advent of the _____ in the 50s. (5%)

Part 4：

Please read the article below and answer the following questions (Q16-Q20) (20%).

Until only just few centuries ago, people believed that the genes of the parent and the child blended together and constituted the exactly same genetic makeup. Then in the early 1800s Gregor Mendel, renowned Austrian scientist, discovered that only certain traits such as the shape of the nose, eye color etc., were passed from parent to child. As a result of his work, and the work of many scientists since, we now know that many of our physical and behavioral characteristics are determined by factors called genes, that is to say that genetic factors handed down from our parents. We also know

that our genes as well as our lifestyles contribute to many common diseases.

The genes we inherit from our parents program our development from conception to adulthood. In each cell we have about 90,000 pairs of genes arranged on 23 pairs of chromosomes, one of the pair being maternal and the other being paternal. Although our brothers and sisters inherit genes from the same parents, the mixture of genes is slightly different in each sibling. It is the reason every organism is different.

Each gene provides instructions for a cell to carry out a single chemical process. They also control the growth and reproduction of cells. They are responsible for the development of the embryo, first into a baby, then a child and eventually an adult. Throughout our lives, genes control cell functions and the repair and replacement of dead or damaged cells. Blood relatives have many genes in common and these genes help to determine family physical characteristics and other traits. Most of these traits, such as the shape of the nose are trivial and have no significant effect on health. Other traits, such as being abnormally short or tall or having a tendency to be overweight, can be associated with an increased risk of certain diseases.

Some diseases such as hemophilia and cystic fibrosis are directly caused by a fault or mutation in a single gene or pair of genes. These rare diseases follow a predictable pattern of inheritance, and this means that families in which the gene is present can usually be given clear, reliable information regarding the risk of the disease affecting future generations. Therefore, gene therapy holds great promise for the cure of diseases and researchers will sooner or later come up with a way to fix the abnormal genes that make us sick without disrupting the normal ones. Viruses, as a way to cure certain diseases, however, replicate easily and move around in the body and interact with other genes, so a virus that is used to cure hemophilia can replicate and enter an area where a tumor gene is located and stimulate it to cause a cancer. In case DNA from bacterium is used, the story might be different though.

More common than these genetic disorders are those in which genes, along with other factors, contribute to a family's susceptibility to certain diseases. For example, some disorders, such as coronary artery disease, tend to run in families, but lifestyle factors such as a high-fat diet, smoking, and lack of exercise also play a part in determining whether these diseases develop. In some diseases that have a genetic component, including asthma, environmental factors, such as living in a polluted area, also play a crucial role. Cancer is not caused simply by one gene, but rather it is a result of a whole variety of circumstances. In a lab, mice were genetically altered to include a gene that causes tumors in the retina of the eye in humans, but surprisingly, none of them developed any symptoms of this disorder. Such complex interplay between genetic susceptibility and environment makes it difficult to predict the risks in adult life for children who are born into families affected by disorders of this kind.

We are now aware of the fact that we are susceptible to diseases passed through families and that our lifestyles can serve to exacerbate symptoms and the early onset of a disease such as heart disease. The good news is that we can use this information to arm ourselves against diseases brought on by an unhealthy lifestyle. If we know that our genes carry a likelihood that we might develop heart disease then it would be prudent to try to live a healthy lifestyle.

(16) Based on the information in paragraph 3, what can be inferred about family traits? (A) A tendency toward obesity can often spark the onset of many other diseases. (B) If one's parents are overweight then it follows that their children will also be overweight. (C) Siblings carry the same genes and so always have the same genetic characteristics. (D)Usually, we only inherit positive genetic characteristics from our parents. (4%)

(17) According to paragraph 4, what can be inferred about people who can be given reliable information? (A) Doctors can assess how big a risk a child might face of inheriting a genetic disease. (B) The mother can choose whether or nor to abort the child based on the information given by the doctor. (C) Doctors can assess if parents can pass on a rare genetic mutation based on the chromosomes. (D)The doctor can advise a couple whether or not it is advisable to have children considering the risks. (4%)

(18) Based on the information in paragraph 5, what can be inferred about the genetic and lifestyle factors explained in paragraph 1? (A) Certain diseases are passed from generation to generation and can be made worse by an unhealthy lifestyle. (B) People who have asthma should in no circumstances live in heavily polluted areas such as cities. (C) The negative gene causing coronary disease is always passed on in families. (D)Sometimes negative genes that skip generations are passed further along the line. (4%)

(19) According to paragraph 5, disease-causing genes are inherited but what does paragraph 2 infer about the possibility of two sisters inheriting a gene causing coronary disease? (A) It is most likely that the two sisters will carry the same negative gene and suffer from the disease. (B) Siblings do not inherit the exactly same shuffle of genes so it does not always follow that they will inherit the same negative genes. (C) Brothers inherit the same shuffle of genes, as do sisters, so they will inherit the same negative genes. (D)All genetic diseases follow a predictable pattern in siblings and in future generations. (4%)

(20) Based on paragraph 6, what can be inferred? (A) An individual should inform the doctor of any symptoms. (B) An individual should exercise and eat well to avoid early onset of an inherited disease. (C) An individual should go for regular tests. (D)Everyone should avoid any activity that might cause strain to the heart. (4%)