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Current affairs summary for prelims

9 January, 2024

# Fatigue Risk Management System

***Context:*** *The DGCA has implemented substantial changes in the Fatigue Risk Management System for flight crew, marking a significant shift in aviation practices.*

➢ **Regulatory Changes for Flight Duty Time Limitations (FDTL)**

- The Directorate General of Civil Aviation (DGCA) has implemented substantial changes to the Flight Duty Time Limitations (FDTL) for flight crew.
- These changes aim to address and mitigate pilot fatigue through a data-driven approach, incorporating feedback from stakeholders such as airline operators, pilot associations, and individuals.
- The revised FDTL regulations are aligned with international best practices, considering inputs from the FAA (USA) and EASA (EU), while also accounting for the unique operating environment in India.

➢ **Key Highlights of the Revised FDTL Regulations:**

- **Extended Weekly Rest Periods:**
  - Weekly rest periods for flight crew have been increased from 36 to 48 hours, providing sufficient time for recovery from cumulative fatigue.
- **Night Duty Definition Amendment:**
  - The definition of night has been amended to cover the period from 0000-0600 hours, allowing for an additional hour of rest in the early morning. This aligns with the Window of Circadian Low (WOCL) from 0200-0600 hours, optimizing alertness.
- **Limits on Flight Time, Duty Periods, and Landings During Night:**
  - Maximum flight time and duty periods for operations encroaching night are now restricted to 8 hours and 10 hours, respectively.
  - The number of landings during night operations has been limited to two, enhancing overall flight safety.
- **Quarterly Fatigue Reports Mandate:**
  - Airline operators must submit quarterly fatigue reports, ensuring a non-punitive and confidential approach to reporting. Action taken on these reports is also required.
- **Transition to Fatigue Risk Management System (FRMS):**
  - The DGCA envisions adopting a Fatigue Risk Management System (FRMS) in the future.
  - FRMS is a data-driven approach to enhance monitoring and reporting of flight crew fatigue, requiring collaboration among regulators, airline operators, and flight crew.
- **Implementation Timeline:**
  - Airline operators must comply with the revised FDTL regulations by June 1, 2024, allowing sufficient time for adaptation and addressing logistical and system changes.
  - With these regulatory changes, the aviation sector in India strives for safer skies by prioritizing pilot well-being, enhancing overall flight safety, and aligning with global best practices.

# Ocean surface waves growing bigger

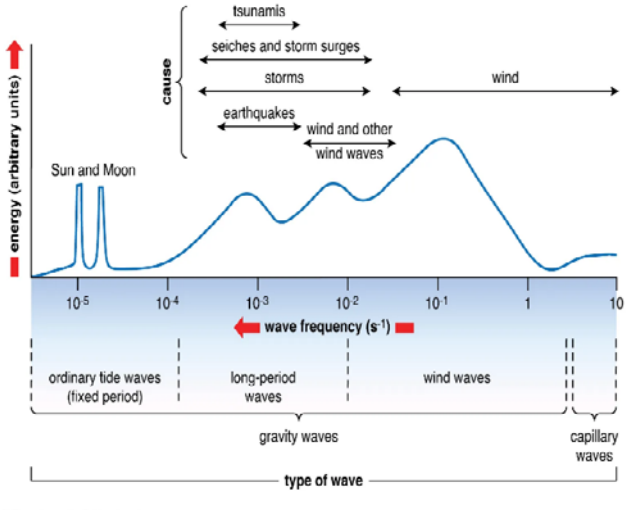
***Context:*** *A recent study indicates a rise in ocean surface waves generated by tropical cyclones over time, raising concerns about potential future implications.*

➢ **Trends in Tropical Cyclone-Induced Ocean Surface Waves:**

- **Increased Wave Height and Footprint:**
  - Both the maximum height and area of ocean surface waves induced by tropical cyclones (TC) have significantly increased over time.
  - These changes surpass the increases in TC maximum wind speed.
- **Data Analysis:**
  - Researchers analyzed 43 years of global data on TC-induced ocean surface waves.
  - The study, published in Nature Communications on January 3, 2024, reveals concerning trends.
- **Definition of Tropical Cyclones:**
  - TCs are warm-core low-pressure systems that develop over tropical or subtropical waters with organized circulation, including hurricanes and typhoons.
  - They produce high winds, large waves, extreme water levels, and heavy rainfall.

➢ **Global Trends in TC-Induced Waves:**

- **Wave Height and Footprint Increase:**
  - The maximum height and area of TC-induced wave footprints globally have increased by approximately 3% and 6% per decade, respectively.
  - The energy of these waves, transferred from the atmosphere to the ocean, has risen by about 9% per decade, three times larger than reported for all waves.
- **Regional Variances:**
  - The North Atlantic, eastern Pacific, and North Indian Ocean show the fastest rates of TC wave footprint increase (17-32% per decade).
  - All ocean basins exhibit a significant long-term increase in the maximum wave height, with the North Atlantic experiencing the largest rise of 5% per decade.

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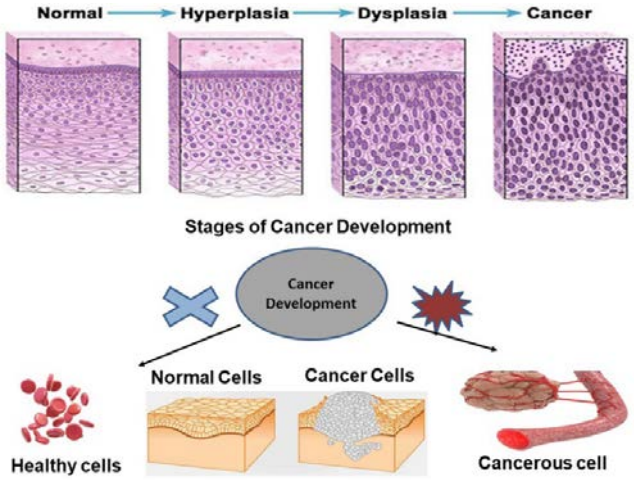
- **Role of TCs in Energy Balance:**
  - **Energy Balance at Air-Sea Interface:**
    - TCs play a crucial role in maintaining the energy balance at the air-sea interface.
    - They extract heat energy from the ocean surface for development and dissipate kinetic energy into the ocean through waves.
  - **Impact on Ocean Circulation:**
    - The rise in wave area is identified as the primary cause of the increasing trend in global wave energy.
    - TCs can cause ocean turbulence that extends deep, potentially altering broader ocean circulation patterns that regulate Earth's climate.
- **ERA5 Wave Reanalysis:**
  - ERA5 is the fifth generation European Centre for Medium-Range Weather Forecasts' atmospheric reanalysis covering from January 1940 to present.
  - It provides hourly estimates of atmospheric, land, and oceanic climate variables.
- **Economic Damage and Climate Alterations:**
  - Intense TCs cause extensive damage through strong winds, heavy rainfall, storm surges, and surface waves.
  - Economic damages from TCs can significantly impact a country's long-term economic development and alter broader patterns of ocean circulation, affecting Earth's climate.

## AI to detect Cancers from scans

***Context:*** *Mumbai's Tata Memorial Hospital is leading an initiative to utilize deep learning, teaching Artificial Intelligence (AI) to enhance early-stage cancer diagnosis.*

- **AI in Cancer Diagnosis:** Deployment of deep learning techniques at a prominent cancer hospital to train Artificial Intelligence (AI) for early cancer detection.
- **Enhancing Detection Tool with Deep Learning:**
  - Development of an AI detection tool capable of assessing tumor hardness, texture, and elasticity with a simple click.
  - Insights into patient survival and responsiveness to chemotherapy provided by the AI tool.
- **Preventing Unnecessary Chemotherapy:** The AI predictive model aims to avoid unnecessary chemotherapy for individuals predicted as non-responders.
- **Bioimaging Bank's Contribution:**
  - Integration of 60,000 digital scans into the hospital's Bioimaging Bank over the past year.
  - Utilization of the bank to create a cancer-specific algorithm and reduce radiation exposure in pediatric patients through AI.
- **Role of AI in Early Cancer Detection:**
  - AI leverages radiomics, extracting crucial information from medical scans that may not be discernible by the human eye.
  - Advanced algorithms and deep learning analyze medical data for early cancer detection.
- **Bioimaging Bank Collaboration:** Collaboration with institutions to establish the Bioimaging Bank, storing slides from medical tests to aid in diagnosis and treatment development.




- **AI Algorithm Predictions:**
  - AI algorithms predict tumor prognosis, including aggressiveness, immunosynthesis rate, and patient survival chances from scans.
  - Final diagnosis and treatment decisions remain under the purview of experienced medical professionals.
- **Functioning of AI Algorithm:**
  - AI analyzes radiological and pathological images, using machine learning to recognize unique features associated with different types of cancer.
  - This technology enables the assessment of tissue changes and potential malignancies for early cancer detection.
- **Technical Partners and Algorithm Testing:** Involvement of technical partners, including academic institutions, for algorithm testing and system intelligence enhancement through machine learning.
- **Impactful Algorithm and Pilot Projects:**
  - Implementation of an impactful algorithm leading to a substantial reduction in radiation exposure, particularly beneficial for pediatric patients.
  - Pilot projects within the ICU utilizing specific algorithms for immediate and accurate diagnoses.
- **AI's Future Role in Cancer Detection:**
  - Anticipation of AI tools revolutionizing cancer detection, expediting treatment access and streamlining CT scan analyses.
  - Recognizing the significance of AI in regions with limited healthcare access facing a surge in cancer cases.
- **Collaborative Approach and Ethical Implementation:**
  - Emphasis on collaborative efforts between AI and healthcare professionals, acknowledging the irreplaceable human touch in medical expertise.
  - Advocacy for rigorous regulatory scrutiny to ensure responsible and ethical implementation of AI in healthcare.

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# NEWS IN BETWEEN THE LINES

## National Cadet Corps

Recently, the defence Minister of India has approved a proposal to raise four more units of the National Cadet Corps (NCC) in Jammu and Kashmir and Ladakh, which is an addition of 12,860 cadets.

**About National Cadet Corps:**

- The National Cadet Corps (NCC) is a **youth wing and tri-service organization** in India that is affiliated with the **Armed Forces** including the Army, Navy and Air Force.
- It was established in **1948** on the recommendation of the **Hridya Nath Kunzru Committee** in the aftermath of British-era uniformed youth groups.
- The committee's goal was to create an organization that would train and motivate Indian youth to become **better citizens and leaders**.
- It **provides basic military training** alongside academic curriculum focusing on Armed Forces and their operations.
- It operates **under the Ministry of Defence** with oversight from a **Director General of three-star military rank.**

## Kala Utsav

Today, the Union Minister for Education and Skill Development & Entrepreneurship will attend the inaugural ceremony of the Kala Utsav 2024 that is going to organise from 9-12 January at National Bhavan the Gandhi Smriti and Darshan Samiti, New Delhi.

**Kala Utsav:**

- The Kala Utsav will be organised by the **Department of School Education and Literacy, Ministry of Education and National Council of Educational Research and Training (NCERT).**
- It will witness performances in **10 art forms**: 1. Vocal Music – Classical, Vocal Music – Traditional Folk, Instrumental Music – Percussive, Instrumental Music – Melodic, Dance – Classical, Dance – Folk, Visual Arts (2-dimensional), Visual Arts (3-dimensional), Indigenous Toys and Games and Drama (Solo acting).
- Around **700 students from 36 States and Union Territories, Kendriya Vidyalaya Sangathan and Navodaya Vidyalaya Samiti** will showcase their art forms in all these genres.
- The valedictory function will be held on **12 January 2024** where prize-winning students will be given the trophies.

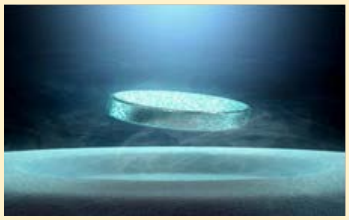
## Oil and Natural Gas Corporation

Recently, the Oil and Natural Gas Corporation (ONGC) has started crude oil production from its massive deep-sea project in the Krishna-Godavari basin block KG-DWN-98/2, which was hit by multiple delays and deadline extensions over the past few years.

**About Oil and Natural Gas Corporation:**

- The Oil and Natural Gas Corporation (ONGC) is a **government-owned company** that extracts crude oil and accounts for **71% of India's oil production**.
- It was conferred with **'Maharatna' status** by the Government of India in November **2010**.
- It is **India's largest oil company and is ranked 158th globally and 4th in India in the 2023 Fortune Global 500 List.**
- It was founded in **1956** and is headquartered in **New Delhi**.
- On **30th of January 2018**, it acquired the entire 51.11% stake of Hindustan Petroleum Corporation Limited.
- It is a public sector undertaking under the ownership of the **Ministry of Petroleum and Natural Gas, Government of India.**

## Meissner Effect



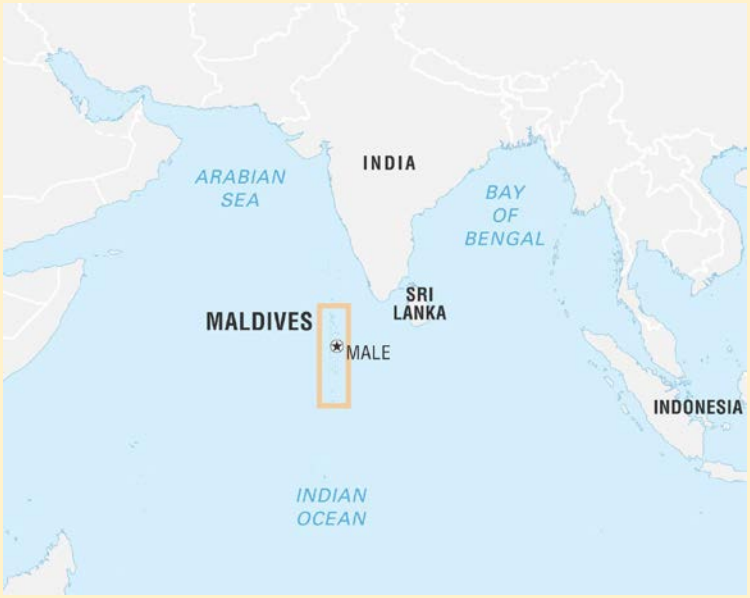
**About Meissner Effect:**

- The Meissner effect is the **expulsion of a magnetic field from the interior of a superconductor** when it transitions into the superconducting state.
- It was discovered in **1933** by **German physicists W. Meissner and R. Ochsenfeld**.
- The effect occurs when a superconductor in a **magnetic field is cooled** to the temperature at which it abruptly loses electrical resistance.
- The researchers have observed the Meissner effect in a compound called **copper-substituted lead apatite**.
- It could be **used to make wires** that transport electricity with zero loss; such transmission losses are the largest source of electric energy loss in the world.
- The material will also have **uses in medical diagnostics, computing, power generation, advanced electronic circuits** and many other fields. For example, the water-absorbing properties of modern diapers were first tested with particle accelerators, which use superconducting magnets to work.

## Place in News

## Maldives

Recently, India has emerged as the top source market for tourism for Maldives since the Covid-19 pandemic.




**Maldives (Capital: Male)**

**Location:** Maldives is an island neighbouring country of India, situated in the Indian Ocean southwest of Sri Lanka and India.

**Significance:**

- The Maldives is composed of **26 atolls**, circular or **oval-shaped** formations consisting of over **1,000 coral islands** enclosing picturesque lagoons.
- It **experiences a tropical climate** influenced by monsoons and boasts rich marine biodiversity with coral reefs, facing challenges from climate change-induced threats like erosion and coral bleaching.
- Its strategic location in the Indian Ocean is pivotal for **maritime trade routes** and security, delineating maritime boundaries **crucial for jurisdictional control** and international relations.

**Language: Dhivehi** is the official language of Maldives.

## POINTS TO PONDER

- Which organization recently issued the standard operating procedure (SOP) for summoning government officials in judicial proceedings? **- Supreme Court of India**
- Who is the author of the recently released book titled “Why Bharat Matters”? **- S. Jaishankar**
- What is the name of the female cheetah that recently gave birth to three cubs in Kuno National Park, Madhya Pradesh? **- Aasha**
- Which three items from Arunachal Pradesh recently received the Geographical Indication (GI) tag? **- Adi kekir, Tibetan carpets, Wancho wooden crafts**
- NATO has signed a contract to buy 1,000 units of which missile defense systems? **- Patriot**