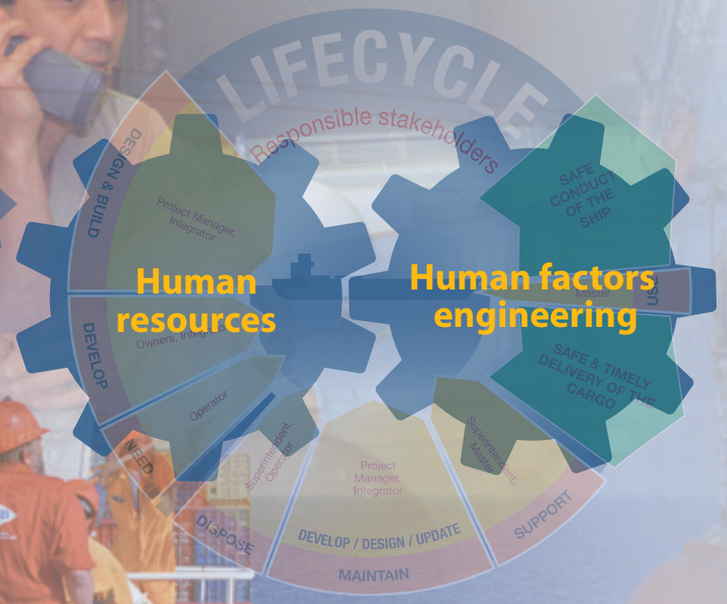
# Integrating the human element A rough guide

Alert!

## Personnel
Correct mix of people onboard to operate and maintain the ship and its systems

## Manning
Number of people required for the safe operation and security of the ship and for the protection of the marine environment in both normal & emergency situations

## Training
Competency and familiarity with the ship and its systems




## Habitability
Comfortable, clean (cleanable) & convivial accommodation, washing & toilet facilities, messrooms, group meeting and exercise areas

## Manoeuvrability
The most appropriate manoeuvring capabilities

## Maintainability
Operational maintenance tasks to be rapid, safe and effective to allow equipment and systems to achieve a specified level of performance

## Workability
Context of use

## Controllability
Integrating people with equipment, systems and interfaces

## Survivability
Adequate firefighting, damage control, lifesaving and security facilities to ensure the safety & security of crew, visitors & passengers

## Occupational Health and Safety
The effect of work, the working environment and living conditions on the health, safety and wellbeing of the person

## System safety
The risks from people using (or misusing) the system

Photography: jalens - joachim affeldt

## Human resources considerations

### Manning:
- Tasks, duties & responsibilities
- Numbers, grades & capacities
- Watchkeeping patterns
- Hours of work & rest
- Required competencies

### Personnel:
- Nationality of officers/ratings
- Selection
- Training
- Physical characteristics for the tasks to be done
- Terms & conditions of service
- Expected competencies

### Training:
- Required knowledge, skills & abilities
- STCW requirements
- Specific training
- Appropriate courses
- In-house/onboard training facilities
- Management/leadership training
- Technical training
- Safety & security training
- Onboard familiarisation
- Onboard safety drills
- Onboard continuation training

## General considerations
- International conventions / regulations
- Crew nationality
- Working language
- Size, shape & gender
- Strength & stamina
- Posture
- Religious & cultural differences
- Intended role
- Ship's operating pattern
- Tours of duty
- Watchkeeping patterns
- Environmental stressors
- Impact of fatigue/stress
- Degree of automation
- Cleanability
- Surface coverings
- Shipboard maintenance policy
- Tripping / falling / bumping / crushing hazards
- Signage
- Understandable operating instructions & procedures
- Company culture

## Human factors engineering considerations

### Habitability:
- Religious & cultural differences
- Need for privacy
- Bathroom facilities
- Messing arrangements
- Facilities for personal recreation & study
- Need for natural light
- Storage space for personal effects
- Furnishing, interior design & decoration

### Maintainability:
- Through-life support
- Onboard expertise
- Accessibility
- Provision & location of tools
- Location of heavy spare parts
- Bench space
- Removal routes
- Noise protected communications
- Policy for onboard spares
- Storage of spare parts and supplies
- Handling of heavy parts
- Disposal of parts & equipment

### Workability:
- The Users
- Tasks
- Fitness for task
- Equipment
- Accessibility
- Communications
- Signage
- Protective equipment

### Controllability:
- Control room, workstation, display screen layout
- Computer dialogue design
- System integration
- Communications
- Alarm philosophy & management
- Direct & peripheral vision
- Daytime/nighttime vision
- Dazzle
- Controls & switches
- Reflection
- Glare

### Manoeuvrability:
- Potential weather conditions
- Communications
- Minimum / maximum / manoeuvring speed
- Propulsion / manoeuvring systems configuration
- Critical system redundancy
- Available harbour services
- Through life costs
- Protection of the environment
- Fuel economy

### System safety:
- Hazard identification
- Potential for human error
- Risk Analysis
- Management of risks
- Operating instructions & procedures
- Communication/working language
- Business imperative
- Training & familiarization
- Potential for environmental damage & pollution
- Recording, reporting & feedback procedures

### Survivability:
- Availability of manpower
- Emergency response systems & procedures
- Ship layout and equipment fit

### Occupational Health and Safety:
- Occupational Health & Safety policy
- Safe working practices
- Development of a safety culture
- Permit to work
- Health awareness – mental & physical
- Medical screening
- Medical support
- Balanced diet
- Provision, maintenance, access & use of Personal Protective Equipment
- Short / long term hazards to health
- Recording, reporting & feedback procedures