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# Human resource management — Workforce allocation

*Management des ressources humaines — Allocation de la main-d'œuvre*



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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 260, *Human resource management*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

# Introduction

The allocation of work to workers is the one of the most fundamental management tasks and responsibilities in an organization. It has a profound impact on people, the organization's ability to deliver and financial outcomes.

The human resource (HR) function should have a significant role in promoting and driving balanced outcomes. Development and monitoring of an allocation framework and allocation policies, as well as compliance, are essential for good allocation practices to be applied by the organization.

Workforce allocation encompasses a broad range of processes, practices and management activities that address organizational performance, people management and compliance issues. These processes focus on a critical resource – people – and thus significantly influence the social climate and performance of an organization. Decisions resulting from these processes directly impact people's well-being, relationships, motivation and performance, and the organization's overall capability, output and collective intelligence.

Allocation occurs in many ways. Work can be directed by the organization or selected by the worker. Decisions can be made using human judgement or automated tools. Workers can be informed of when to attend shift work, what activity to complete in project work, what job to do, and be appointed to a position or be informed in other ways.

This document recommends good practices common to all types of allocation. It recommends an allocation framework, processes and steps, and explains how to prepare, assign and inform allocation decisions.

Allocation processes follow workforce planning processes that segment the workforce, calculate gaps and plan recruiting, training and transfers (see ISO 30409). Allocation processes generally cease at a level before workers self-manage their work, possibly including decisions on individual tasks. Workforce allocation is a subset of broader workforce management processes and interfaces with absence management and timekeeping processes. See Figure 1.

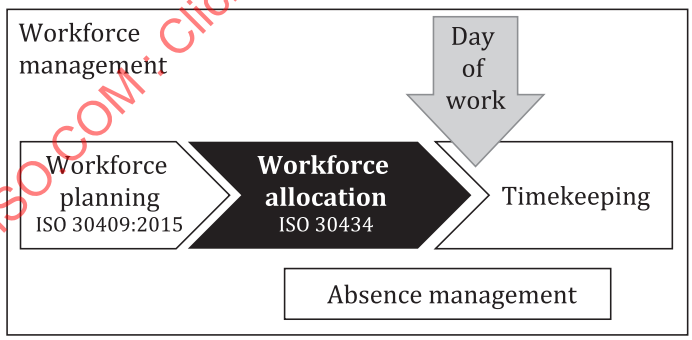


**Figure 1 — Workforce management and allocation processes**

Effective workforce allocation practices ensure the organization's work requirements are identified and allocated appropriately. The principles of effective workforce allocation are:

a) complying with state and organizational regulations, policies, rules and agreements;

b) ensuring zero harm to workers, whether physical or mental;

c) allocating work with equity and respect;

d) considering options for flexibility in work times and work formats;

e) enabling transparent and fair allocation decisions;

f) communicating allocation decisions clearly and in a timely manner that enables workers to acknowledge work allocated to them.

Users of this document will include:

1) workforce professionals, including resource managers, workforce managers, workforce schedulers, roster coordinators, allocation coordinators, staffing coordinators, workforce coordinators and workforce analysts;

2) human resource managers;

3) frontline and executive managers;

4) workforce policy makers;

5) project managers and consultants involved in workforce systems and processes;

6) vendors of workforce technology;

7) trade union or employee representatives and employer groups.

# Human resource management — Workforce allocation

## 1 Scope

This document describes a framework of processes, practices and management activities for allocating work to workers. Its high-level principles and processes are applicable to all allocation methods and workforce types. It can be used in all types of organizations and industry sectors, and from small teams to large complex organizations. It applies to all workforce sourcing methods, whether the workforce is made up of internal employees or externally sourced workers.

This document also addresses the relationship between allocation decisions and stakeholders, including operations, finance, human resource functions and, most importantly, workers.

This document explains how to create an allocation framework, design an allocation process and document, communicate, measure and improve the process. It also suggests preventative actions to stop or mitigate undesirable outcomes.

This document does not address:

a) absence management or planning or timekeeping;

b) role or skill-based workforce planning (refer to ISO 30409);

c) labour standards;

d) training or succession planning;

e) recruitment (refer to ISO 30405 and ISO 30409);

f) compensation or performance reviews;

g) health and safety (refer to ISO 45001);

h) work ergonomics (refer to ISO 6385);

i) methods of organizing specific types of work (e.g. lean manufacturing, agile project management);

j) automation of tasks using "digital workers", such as physical robots and artificial intelligence bots.

Annexes to this document describe details and foundational concepts of allocation applied in various industries as examples to support the theory.



## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 30400, *Human resource management — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 30400 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

**3.1**
**workforce allocation**
process of preparing, assigning and informing *allocation decisions* (3.2), collecting the workers' responses and adjusting allocation

**3.2**
**allocation decision**
determination as to which worker(s) will be assigned to what work

**3.3**
**allocation horizon**
period prior to the commencement of work where an *allocation decision* (3.2) is made and/or workers and other stakeholders are meant to be informed of an allocation decision

**3.4**
**allocation stage**
series of preparation, assignment, inform and respond steps that are taken once or repeatedly around *allocation decisions* (3.2) related to a specific *allocation horizon* (3.3)

## 4 Workforce allocation

For the purposes of this document, allocation is the process of preparing, assigning and informing allocation decisions, collecting the workers' responses and adjusting allocation.

The act of assignment has four aspects:

a) matching workers and work;

b) validating that target outcomes can be achieved;

c) taking preventative action if needed;

d) accepting compromise.

Organizations should define target allocation outcomes so that assignment decisions can be validated. Validation can involve checking that work will be delivered, workers will be utilized and workload is reasonable, within target outcomes.

When target outcomes are forecast to not be achieved with the current assignment, then further alternative action or compromise is needed. Alternatively, compromise can be in the form of acceptance of under-delivery, low utilization or higher workloads.

Key to workforce allocation processes is the quantification of effort forecasts for each period. There are four forms of effort:

1) demand: the quantity of work that will need to be performed;

2) allocated work: the work allocated to workers for a specific period;

3) capacity: the total quantity of workers' availability;

4) worker availability: the time and duration for which an individual worker can undertake work.

# 5 Understanding the organization

## 5.1 General

Before defining an allocation framework and processes, a clear understanding of the organization, workers, work, stakeholders, rules and policies should be established and documented. This understanding should include current processes and systems used in the organization.

Organizations can have workforces within workforces, each requiring potentially unique allocation processes. An organization can have multiple workforce allocation processes. In general, each could be based on a unique combination of work and worker characteristics (e.g. skills, competences, education, certifications and accreditations, and experience), management expectations and individual requirements. Key characteristics (and their attributes) should be identified and documented to a level that enables effective workforce allocation.

NOTE Segmentation, roles, capacity and productivity are inputs into the workforce allocation process. For workforce segmentation in the context of workforce planning, refer to ISO 30409.

## 5.2 Organization characteristics

Characteristics of the organization, relevant to allocation, should be identified in a way that considers:

1) the organization's values, vision, mission and strategy;

2) the organization's design and structure, including its governance and decision and delegation hierarchies (e.g. subsidiaries, regions or locations, markets, customers, products, service lines, disciplines, projects).

## 5.3 Work characteristics

Characteristics of work should be identified in a way that considers:

1) how work is defined and the granularity at which it is defined and allocated, for example project phase, task, shift, where, when; including if the work is done remotely (from home or off-site) and which roles (and skills) are needed for the work;

2) how demand is quantified, if at all, e.g. headcount, hours per task, full-time equivalent (FTE), story points.

The way work, roles and demand are described depends on the nature of the work. Refer to Table 1 for examples.

**Table 1 — Examples of work characteristics**

| Sector or function | Work | Roles | Examples of demand |
|---|---|---|---|
| Manufacturing | Ship, store, pack, assemble, component, line, task | Line worker, driver, checker, machine operator, packer | Headcount per shift |
| Project delivery | Portfolio, programme, projects, team, phase, element, task | Front-end developer, senior bridge designer, stakeholder manager, trainer | Hours per task |
| Corporate support | Position, location | Talent acquisition officer, eastern region compliance officer, chief financial officer, receptionist | Number of positions, FTE |

## 5.4 Worker characteristics

Characteristics of workers, relevant to allocation, should be identified in a way that considers:

1) worker availability or unavailability;

2) worker attributes, e.g. their roles, skills, competences, education (certifications or accreditations), location, preferences and/or restrictions (physical, sensory or cognitive);

3) source of the worker, e.g. employee, contractor, secondment.

## 5.5 Allocation characteristics

Characteristics of allocation should be identified in a way that considers:

1) method of allocation, e.g. human judgement, automated or technology assisted;

2) allocation granularity, for example whether work is at a project level, phase level, shift or task level;

3) outcome dependence, i.e. whether workers are to be allocated work with or without considering outcomes, e.g. ability to deliver, utilization or productivity or workloads;

4) driving constraints, i.e. whether work or workforce capacity is ultimately fixed at the time of allocation:

   a) workforce-constrained, i.e. capacity drives work that can be delivered, e.g. typical agile projects, permanent employees in professional services;

   b) work-constrained, i.e. work drives required capacity, e.g. waterfall projects, train drivers, casual employment in retail, manufacturing and fast food stores;

   c) both work and workforce constrained, e.g. hospital units with fixed capacity and critically ill patients, projects with fixed team sizes and delivery dates;

5) implications and complexity, for example whether allocation can impact potentially more important work planned or to what degree individual allocation decisions are interrelated (e.g. inter-project dependencies);

6) allocation strategy, i.e. the approach to matching work to workers, based on the complexity of the allocation scenario. For example, an allocator can list the work to be assigned in order of priority (e.g. deadline) and then match a worker to each work item. Alternatively, an allocator can list workers (e.g. seniority) in order of priority and match work to one worker at a time. In complex situations, optimization algorithms would consider simultaneous matching for an optimal result.

This is not an exhaustive list of allocation characteristics and can vary depending on, for example, the nature of business, regulatory framework, customers and products.

## 5.6 Allocator characteristics

Characteristics of the people responsible and/or the systems used for assigning workers to work should be identified. Allocators can include line managers, functional managers in a matrix organization, workforce planners or allocators or the workers themselves. Allocator attributes can include their location, skills, competences, education (certifications or accreditations), role or more.

EXAMPLE Industrial engineers in manufacturing, nurse managers in healthcare, programme managers in project-based environments.

## 5.7 Communication characteristics

Characteristics of communication relevant to allocation should be identified in a way that includes:

1) what is communicated, i.e. how and when workers are informed, and which information;
2) the channels and media used for communication, e.g. digital, emails, notice boards;
3) how privacy is protected and security ensured;
4) communication visibility, equity, efficiency and the culture of the organization;
5) frequency of communication.

## 5.8 Stakeholders

Stakeholders that influence, or are impacted by, workforce allocation decisions should be identified.

Stakeholders in workforce allocation include, but are not limited to, operations, finance, HR, workers, employee representatives, regulatory or government bodies and customers.

NOTE Stakeholders provide information that inputs into, or receive information output from, the workforce allocation process (e.g. budgets from finance, shift rosters, availability plans). This is vital for the workforce allocation process and can include information regarding timely delivery (operations), assignment or allocation of work (people) and adherence to budgets (finance).

## 5.9 Rules and policies

Rules and policies that impact the workforce allocation process should be identified in a way that ensures all stakeholders understand the implications for their role and responsibilities in the allocation process, including:

1) statutory, regulatory and contractual rules;
2) contractual agreements with:
    a) employees, e.g. employment contracts;
    b) employee representations, e.g. collective labour agreements, trade unions, labour organizations;
    c) contractors, e.g. supply chain partner agreements to provide workers;
    d) customers, e.g. service-level agreements;
3) organizational policies, such as:
    a) health, safety and well-being, e.g. minimum presence of first aiders and/or fire wardens per work area;
    b) diversity and inclusion;
    c) special work requirements in areas prone to natural catastrophes or disasters;
    d) privacy;
    e) data security;
4) worker requirements and expectations, such as:
    a) the right to accept or reject work;
    b) travel for work;
    c) overtime or fatigue restrictions;

d) commuting from/to workplaces;

5) worker autonomy and self-allocation policies;

6) flexibility for workers, including:

   a) measures to avoid work–family conflicts or improve work–life balance;

   b) options to organize working time flexibly, e.g. flexitime or temporary or permanent part-time work;

   c) team self-organization, e.g. workers who assign shifts among themselves, an agile project team that pulls tasks from a backlog;

   d) on-site and remote work arrangements;

7) flexibility for the organization.

   Organizations should identify elements of flexibility to address demand fluctuations and uncertainty of work information, such as:

   a) time banking to deploy staff flexibly and address seasonal demand fluctuations;

   b) stand-by and relief staff to address unforeseeable demand patterns or as a relief for unforeseeable absenteeism;

   c) workforce mobility, e.g. within certain geographical boundaries.

Certain elements of flexibility can benefit the organization and workers. For example, when extra time is worked, a credit is tallied (e.g. time accounts, time-in-lieu). This credit can be drawn from for future absences. In other cases, absences can be taken in advance, and extra time worked later.

While flexibility is beneficial for both the workers and the organization, the principle is to drive organizational efficiency and effectiveness while maintaining workers' well-being. If applicable, attention should be paid to the participation of the employee representatives on the introduction, conditions and implementation of flexible work.

## 5.10 Objectives and success factors

The objectives of workforce allocation should be identified and guided by certain principles of effective workforce allocation (refer to the Introduction).

Success factors should be identified and documented so the organization can measure the success of allocation by:

1) validating forecast outcomes against target outcomes (refer to 7.6.2.4);

2) measuring the success of past allocation system performance (refer to Clause 9).

Forecast outcomes are essential for validation processes and can be categorized for:

a) delivery, e.g. output, timely delivery, performance;

b) people, e.g. workload, physical, mental and social well-being;

c) finance, e.g. utilization, adherence to budgets.

Success factors that identify target allocation outcomes and system performance should be documented based on objectives. They should be expressed in ranges of tolerance (e.g. forecast utilization could be limited to between 110 % and 80 %). This will enable the organization to confirm forecast outcomes are acceptable, period by period, into the future and monitor the performance and progress of the workforce allocation processes to generate a feedback loop for continual improvement.

# 6 Create a framework

Every organization should have an effective workforce allocation framework that supports the organization's operational objectives and successful delivery of performance goals. The allocation framework should accommodate one or more workforces (each with its own distinct allocation process) and include the following suggested management principles.

Participant(s) in the framework design should be considered. These participants could include a wide range of stakeholders (refer to 5.8).

1) Responsibilities and authority should be confirmed and documented in a job or position description that provides a mandate, a specific scope and an explanation of the authority that the job can or should exercise.

   A workforce allocation function can be integrated in other organizational functions or reside as an independent unit in the organization. It should provide scope and authority to affect the desired operational outcomes.

2) Accountability for allocation delivery should be confirmed and documented in a set of performance goals that are measurable, contribute to the organizational strategy and have clearly identified ownership within the organizational structure.

   Accountability should ensure organizational integrity so that policy and practices are compatible. In applying workforce allocation practices, the organization's environmental, social and corporate governance standards should be observed.

   Workforce allocation function accountability should be documented in job descriptions or duty statements that include associated metrics that measure the job's effectiveness. Including accountability in job descriptions creates transparency critical to the communication with workers. It allows people to trust what the organization says it values and ensures that stated expectations are aligned and valid.

3) Operational resourcing for effective workforce allocation should be confirmed and documented to ensure clear visibility of workload, capacity and capability has been established. The workforce allocation function should ensure that it has access to all information relating to the distributable workload it is servicing, resource capacity and other constraints.

   Workforce allocators should be trained (even accredited) and operate with a solid understanding of the needs, goals and constraints of the organization and stakeholders.

4) Expectations of leadership in driving the importance of workforce allocation should be confirmed and documented. Leadership should drive agreement, enablement and sustainment of desired operational outcomes. Leadership should align other organizational functions and ensure an appropriate level of employee participation and involvement of employee representations in line with organizational policies and culture.

5) Transparency of the framework should ensure workers understand the organization's expectations by making allocation rules and protocols concise, accessible, consistently applied and supported by operational leadership. Ways to communicate the framework and any modifications to it should be confirmed and documented.

6) Acknowledging the ability of workers to exercise some degree of autonomy around accepting or declining assigned work should be documented. Exercising an option to decline or query the assignment can occur due to the workers' capacity, capability, authority or license to operate.

7) Communication to every worker and stakeholder at every level, to ensure an effective and sustainable allocation process, should be confirmed and documented. Communication processes

should support a culture of good allocation and organizational policies for transparency, equity and efficiency.

Communication processes should be designed to protect worker privacy and ensure security of sensitive allocation information. Communication mechanisms should be contemporary and accessible to all employees.

8) Continual improvement that provides an ability to monitor and measure contributory components for performance, effectiveness and compliance should be confirmed and documented. This should incorporate the ability to analyse, recommend and apply process improvements in allocation and organizational outcomes.

# 7 Design the process

## 7.1 General

An allocation process should be designed and documented for each workforce based on work and workforce characteristics (refer to Clause 5). At a minimum, each allocation process should define the applicable units, pools, allocation stages, allocation steps, periods, horizons, information flow and responsibilities as recommended in this clause. Typically, allocation processes are repetitive in nature.

The relationship between organization, workforce, units and pools is presented in Figure 2. Refer to Annex C for examples of allocation processes for various types of workforce.

## 7.2 Units

Workforce allocation should occur within units, including role and location, e.g. assigning tasks to bridge engineers in the London office. Units are used for balancing and matching work and workers, validating outcomes and defining responsibilities.

Units should be designed to suit allocation steps in allocation stages (refer to 7.4). Units can be aggregated into higher-level units if required by allocation stage design. Units will possibly need to be broken down into smaller units to ensure the scale of the allocation task is manageable.

Units provide a bounded context of work and workers that share common attributes, for example baggage handlers in Sydney defined by “location/role/team”, with higher-level units being defined by “location/role”.

## 7.3 Pools

Workers can be sourced from a pool of workers into units. Workers in a pool could have characteristics relevant to a single unit or multiple units. Pools typically consist of potential workers with characteristics that have been pre-qualified, e.g. agency staff, trained fast food workers, registered nurses.

Whether or not workers formally belong to the unit, they should have the same status for the purpose of workforce allocation.

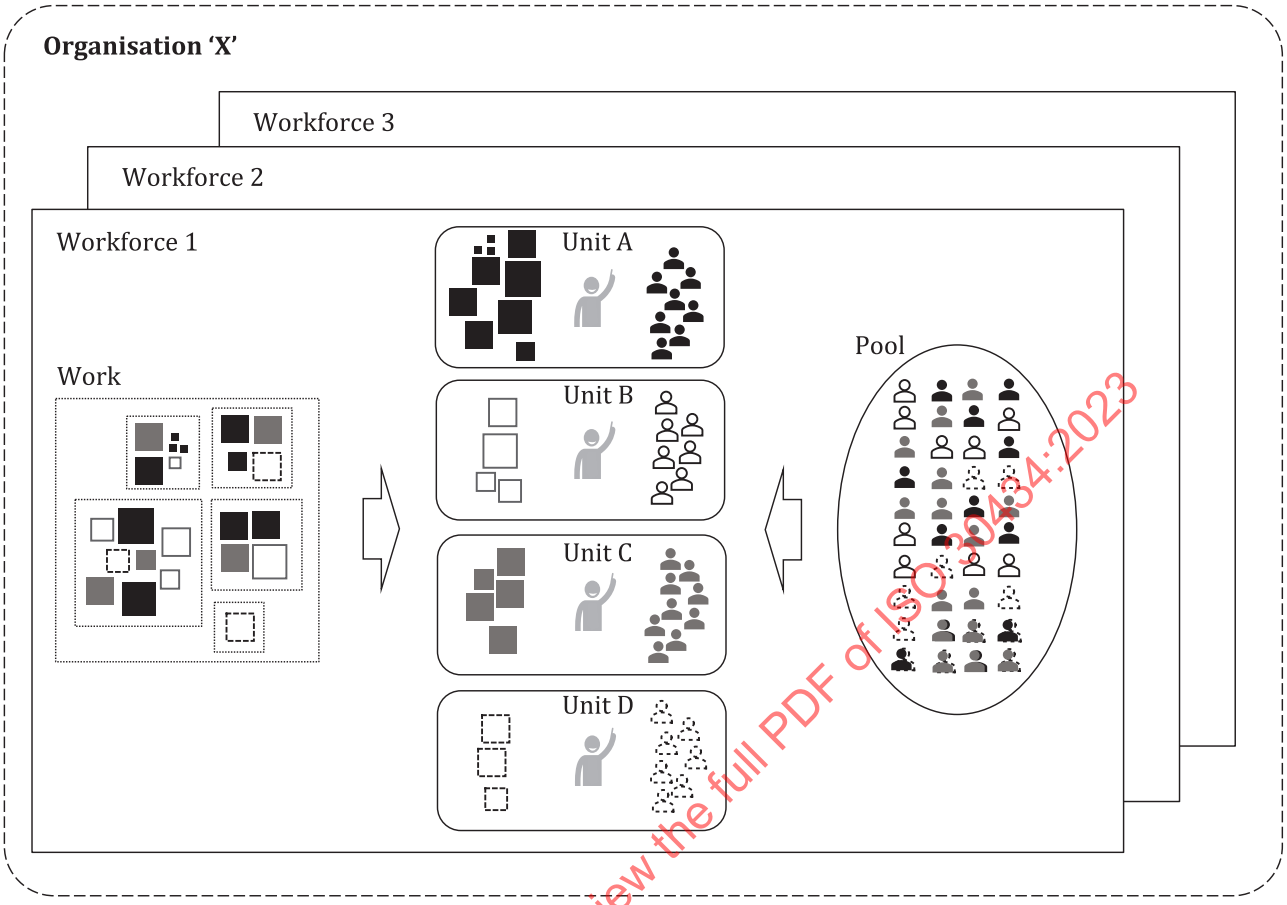


**Figure 2 — Workforces, work, units and pools**

Each workforce should have its own allocation process.

NOTE Roles, skills, capacity and location are inputs into the workforce allocation process. The workforces in units used for workforce allocation might or might not coincide with workforce segments as derived in workforce planning. For segmentation in workforce planning, refer to ISO 30409.

## 7.4 Allocation stages

### 7.4.1 General

The allocation process should be broken into allocation stages. Each allocation stage includes an allocation decision or a series of similar decisions within a unit. For example:

1) Shift work can require "on-off", "shift" or "task" decisions.

2) Project work can require "programme", "project", "phase" or "task" decisions.

3) Allocation of a receptionist can involve a single decision, namely assigning the receptionist to the position, taken as part of recruiting.

Each allocation stage has allocation steps, an allocation horizon and an allocation period (refer to Figure 3). All allocation stages should be listed in order of their allocation horizon, from the longest to the shortest allocation horizon. Decisions will generally be more granular (i.e. more detailed) in later stages.

Assignment within a unit, at each allocation stage, can be for individual items of work (e.g. tasks, deliverables), individual workers, larger aggregations of work (e.g. projects) or groups of people (e.g. teams). The way units, with workers and work, are broken down is driven by the design of the allocation

stages. Different workforces can be scheduled when to work, assigned multiple activities, or assigned a specific job or position.

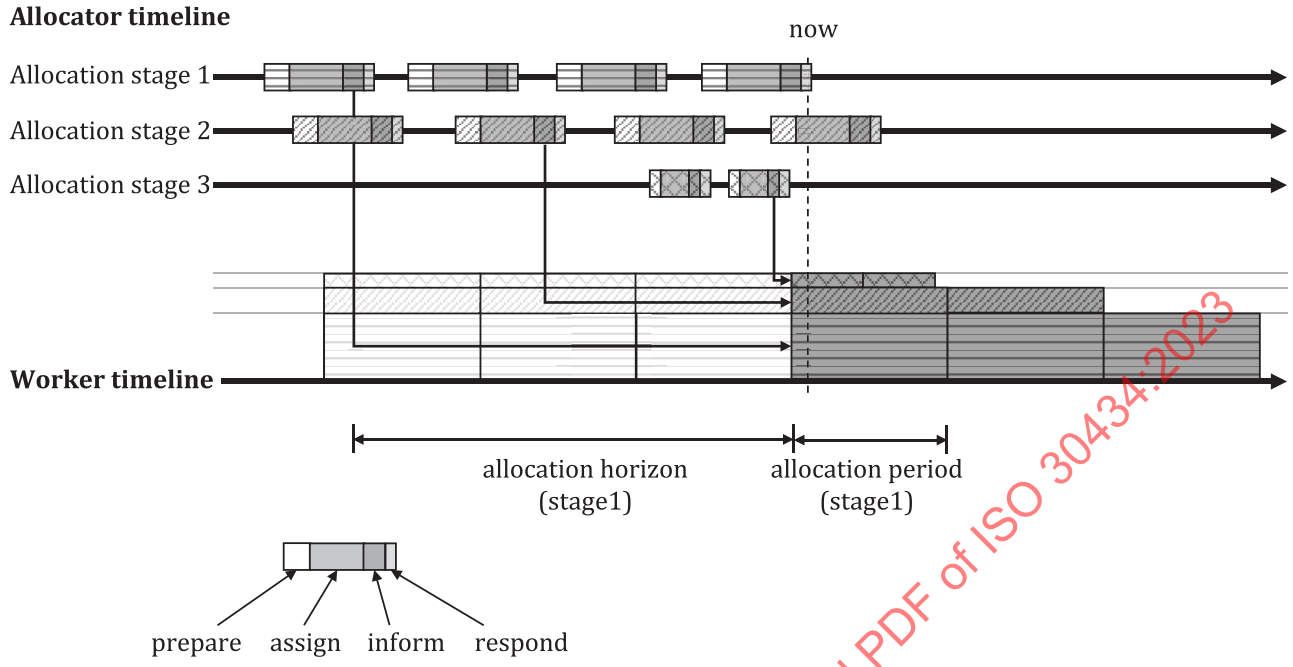


**Figure 3 — Allocation stages, steps, horizon and period**

### 7.4.2 Allocation steps

Allocation stages should include one or more of the following allocation steps:

1) Prepare: gather input data about work and workers.

2) Assign: match work and workers.

3) Inform: advise workers and/or stakeholders of assignments.

4) Respond: workers and/or stakeholders acknowledge, accept, reject, query or amend assignment.

Allocation steps are repeated for each allocation stage. As a minimum, the decisions in each stage should include the prepare and assign steps. Inform and respond steps can also be applied in any allocation stage, but as a minimum should be included in the final allocation stage before the work commences.

Allocation assignments (step 2) can be tentative and are not necessarily commitments. In some sectors this is known as soft-booking. Commitment sometimes occurs when workers are informed (step 3). Once a communication has been acknowledged, the decision would typically be fixed for the next decision(s) and subsequent allocation stages.

A process for managing change of previously informed decisions should also be documented (if applicable).

Organizations should use flexible elements (e.g. buffers, relief, stand-by duties) to cater for typical demand volatility, typical changes in work or worker information from subsequent allocation stages and the uncertainty of demand information. Refer to Annex C allocation stage examples for various workforce types.

### 7.4.3 Allocation period

For each allocation stage, the allocation period (duration) that assignment(s) apply to should be documented, where applicable. The period can have a fixed or variable duration and be consistent

for each allocation stage or be unique for each allocation (e.g. project tasks have varying durations). Periods from a series of allocation stages will possibly overlap. The allocation period will typically be longer for higher allocation stages (refer to Table 2).

EXAMPLES

For shift workers, shifts can be allocated for fixed periods of one month each without overlap.

For project workers, tasks can be allocated with varying start and finish dates. Consequently, some workers can have work assigned for just a few weeks while others are assigned for months. These project tasks will possibly need to be undertaken concurrently and therefore overlap in time.

### 7.4.4 Allocation horizon

For each allocation stage, the time between assigning work to workers (step 2) and commencing the work should be documented as the allocation horizon. If the allocation stage has an inform step (step 3), then the allocation horizon will be the time needed to inform the worker before work commences, i.e. lead time. Allocation horizons can be derived from organizational requirements, e.g. deadlines as set out in corporate labour agreements.

Allocation horizons can vary from many months to minutes before the commencement of work, depending on the requirements of the work, worker and stakeholder. For example, shift workers will possibly be entitled to a period of notice, as set out in Table 2.

**Table 2 — Example of allocation stages for shift work**

| Allocation stage ID | Stage description | Period | Horizon |
|---|---|---|---|
| 1 | Days on or days off | 4 weeks | 12 weeks |
| 2 | Shift | 1 week | 2 weeks |
| 3 | Task | 1 day | 1 day |

NOTE The allocation horizon represents the deadline to communicate allocation decisions. An allocator can finalize all allocation decisions for all stages very early in the first stage but not communicate them until that stage's horizon becomes current.

### 7.4.5 Information flow

Information from step 1: prepare, input into step 2: assign and output to step 3: inform, should be documented for each allocation stage, similar to Table 3.

**Table 3 — Example of input and output information summary documentation (see Annex C)**

| | Decision stage | | Stage 1 | Stage 2 | Stage *n* |
|---|---|---|---|---|---|
| **Prepare (inputs)** | Data | | | | |
| | Rules | | | | |
| | Stakeholders | | | | |
| **Assign (match)** | Allocator | | | | |
| | Validator | | | | |
| | Horizon/[period] | | | | |
| **Inform (output)** | Worker | Horizon/[period] | | | |
| | | Information | | | |
| | Stakeholder | Horizon/[period] | | | |
| | | Information | | | |

Allocation horizons for the provision of information should be documented for both the organization and the workers.

## 7.5 Workforce allocator and validator

### 7.5.1 General

People responsible for assigning workers to work in a unit and allocation stage should be documented as the workforce allocator(s). The people responsible for validating assignment outcomes should be documented as the workforce validator(s).

Allocators and validators can be the same person or system. Allocators and validators can be line managers, functional managers in a matrix organization, workforce planners or allocators and/or software solutions. Allocators can be the workers if they self-allocate.

Allocators should know and follow the rules and policies for the respective allocation stage. Requirements for people to be allocators and validators should be documented.

### 7.5.2 Directed allocation and self-allocation

Organizations should define which decisions are taken by the workers (self-allocation) and which decisions are taken by the organization (directed allocation). These choices should be made in line with the organization's strategy, culture, leadership style and organizational requirements.

In self-allocation, organizations should ensure that:

1) workers have the required information to make informed allocation decisions;
2) workers know the rules of allocation and elements of flexibility;
3) all applicable rules and policies are applied;
4) appropriate support is provided (e.g. facilitation roles, escalation mechanisms) if the allocation process could lead to conflicts among workers;
5) workers do not overcommit themselves.

In directed allocation, organizations should ensure that allocators:

a) have the required knowledge, training, skills and information to make qualified allocation decisions;
b) know all relevant rules and policies;
c) have the required knowledge to exploit elements of flexibility;
d) are fair and impartial.

### 7.5.3 Allocation systems

Allocation can occur using different levels of system support. It can be as simple as cognitive judgement expressed by a manager as a verbal direction, pen and paper documentation, or as sophisticated as automated systems that support allocator decisions. For specific stages, the allocation process can be fully automated and optimized (e.g. the daily allocation of tasks). Advanced systems can optimize work and worker allocation by manipulating multiple variables that include the timing of when specific activities are to take place (beyond the scope of this document).

Key features of an allocation system can include modules for worker role or skill inventory, work details, assigning work, validating outcomes and informing workers.

Regardless of the level of automation offered by systems, the organization remains responsible for the allocation results. Typically, optimization or automation are used at different allocation stages. Stages with the greatest impact on workers should be reviewed by an allocator prior to the inform step.

If systems are used as part of allocation, organizations should ensure that the systems provide appropriate and up-to-date information for the allocation process. If decisions are proposed or taken by a system, organizations should ensure all requirements are met.

## 7.6 Allocation steps

### 7.6.1 Step 1: Prepare

#### 7.6.1.1 General

For each allocation stage, preparation activities should be documented. Preparation mostly concerns the collation of input information used to assign people to work.

Allocators should ensure that all information provided from workers and stakeholders is appropriate and that rules and policies will be incorporated. If allocation is system-supported, this can be automatic. In the case of self-allocation, appropriate information should be provided to the workers.

#### 7.6.1.2 Rules and policies

Rules and policies (described in Clause 4) that impact workforce allocation in a respective stage should be documented in the prepare step and incorporated into the assign and inform steps of each allocation stage (refer to 5.9).

This information only needs to be collated once or when there is a change to policies or rules.

#### 7.6.1.3 Stakeholder requirements

Stakeholder requirements (described in 5.8) should be documented in the prepare step for each allocation stage.

This information will possibly only need to be collated once if stakeholder requirements are not specific to the individual decisions.

#### 7.6.1.4 Work information

For each allocation stage and unit, relevant work information should be identified and documented using characteristics identified in 5.3.

Work can be defined at the level of tasks, estimates or forecasts, or aggregates (refer to Annex A). Work will in general be characterized by attributes such as:

1) identification and/or description of the work;
2) when the work is to be done (if there is a requirement):
   a) when it is to start and finish, e.g. shift windows, immediate execution;
   b) when it is to be completed, e.g. project milestones or due dates;
3) roles, skills and proficiencies needed to complete the work;
4) demand;
5) other attributes as needed for matching, such as location (e.g. customer or delivery location), task mobility or physicality, on- or off-site task delivery.

For details, refer to Annex A.

Workforce allocation should account for remaining work not completed. Sometimes remaining work already accounts for the assignment in previous allocation stages. Identification of remaining work

requires monitoring of work progress. (Progress tracking and productivity metrics are beyond the scope of this document.)

NOTE 1 In some sectors, workers who will do the work are required to estimate the demand and/or confirm the allocated work.

NOTE 2 Work information is often less accurate and more uncertain for higher allocation stages than for lower allocation stages.

#### 7.6.1.5 Worker information

For each allocation stage and unit, relevant worker information should be identified and documented, using characteristics identified in Clause 5.

Worker information can include:

1) availability for each period;
2) roles, skills, proficiencies, authorities and restrictions;
3) preferences;
4) worker restrictions (physical, sensory, cognitive);
5) other information required for the matching of workers and work (e.g. location if more than one location is involved, physicality, mobility).

For details, refer to Annex A.

For the purpose of validation, availability should be aggregated into, for example, capacity per role or skill, or location. Capacity information will possibly not be required if the workforce is not constrained (refer to 5.5).

Organizations should distinguish between regular capacity as derived from regular availability (e.g. contractual working times for employees) and extra capacity derived from extra availability (e.g. overtime within given limits). Organizations should decide if external workers, when applicable, contribute to regular capacity or extra capacity.

EXAMPLES Manufacturing companies often use labour hires (also called agency or temporary workers) to cover peak workloads that could be extra capacity. In distribution centres, these same workers can be part of the regular capacity.

If remaining work has previously been allocated, allocation decisions should consider only remaining capacity.

Worker information will generally have a degree of assignment uncertainty, e.g. worker availability reduced by illness or resignations. The longer the allocation horizon, the higher the uncertainty will typically be.

#### 7.6.1.6 Other information

In some cases, information other than work and worker information is required for the purpose of workforce allocation (e.g. road closure and traffic information for food delivery services, availability of on-site workstations for organizations with flexible office arrangements).

Furthermore, information from previous allocations could be required (e.g. for ensuring fair allocations), allowing adjustments to be made between allocation decisions.

### 7.6.2 Step 2: Assign

#### 7.6.2.1 General

The process of assigning work to workers should be documented for each allocation stage and include four aspects:

1) how to match work to workers;

2) how to validate outcomes;

3) when to take preventative action;

4) when to accept compromise.

#### 7.6.2.2 Matching work and workers

For each allocation stage, the strategies used for matching work and workers should be documented.

There are many ways to match. Essential to all methods is that the residual availability of workers and residual work is matched by common characteristics. Obvious matching characteristics are role or skill. Another is timing, e.g. when the planned work aligns with worker availability. Many types of information are used as criteria to match and inform (refer to Annex A).

Matching can happen using groups of workers (e.g. teams) or individual workers, and to individual pieces of work (e.g. tasks) or larger volumes of work (e.g. projects or work packages).

Organizations can apply various matching strategies, such as the following:

1) If the workforce is not constrained, work can be matched by finding workers from a larger pool by using, for example, availability and/or skill as search criteria.

2) If the workforce is constrained, allocation could iterate through matching workers and work (e.g. based on priorities, skills, preferences).

3) Stepwise approaches should be used, for example by first matching work to special groups of workers (e.g. internal workers before external workers, high skills before low skills).

4) If work or workers have more than one attribute, for example where workers are multi-skilled, there could be situations where sequential assignment of work to workers yields suboptimal outcomes because the individual matching decisions are strongly interrelated (e.g. if work A is assigned to worker 1, this means worker 2 is the only one left for work B, and because of that, worker 3 is the only one left for work C, and so on). In such cases, assignment algorithms can be used to match work and workers simultaneously by considering the mutual dependencies.

5) After allocation at the level of units, further opportunities for balancing work and capacity could be identified between units or at higher-level units.

Matching can also involve further decisions (e.g. scheduling, assignment of equipment). This is beyond the scope of this document.

If remaining work is to be taken into account when allocating, then the process for monitoring progress and providing feedback to the latest assignment step is to be identified and documented.

#### 7.6.2.3 Rules and policies

Rules and policies that impact allocation processes should be documented. When matching work and workers, all applicable rules and policies (refer to 7.6.1.2) and stakeholder requirements (refer to 7.6.1.3) should be respected. Matching should be done in a way that caters and optimizes for the objectives and success factors (refer to 5.10). See Figure 4.

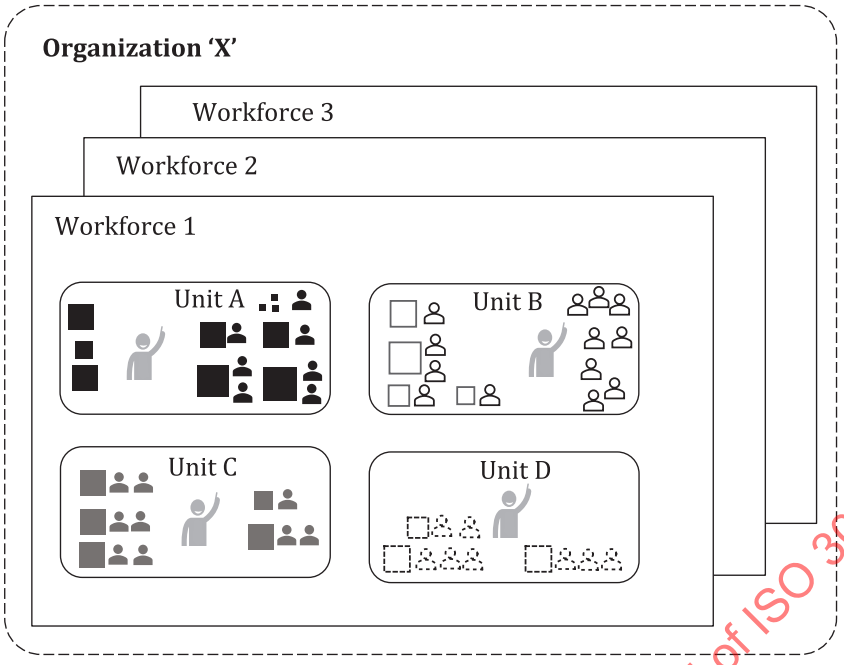


**Figure 4 — Units after allocation**

#### 7.6.2.4 Validate outcomes

Organizations should ensure that forecast outcomes for each unit are within acceptable tolerances as defined by target outcomes (refer to 5.10). Processes for validating forecast outcomes against target outcomes should be documented.

The purpose of validation should be to know or check that for each period:

1) work will be delivered – by comparing total demand with the total allocated work;

2) workers will be utilized – by comparing total allocated work with the total capacity (only in the case of workforce-constrained scenarios, as defined by 5.5);

3) workload is not excessive – by comparing allocated work with the worker's availability.

Validation should happen:

— at the level of the allocation units;

— at the level of broader units (if used in the matching strategy);

— at the level of individual roles or skills within a unit (if appropriate, e.g. when there is a shortage of capacity in a specific skill).

Validation could be inherent within matching decisions or undertaken after matching decisions.

Examples of inherent validation include:

— scheduling software that solves for unconstrained inputs (e.g. remaining work, remaining worker availability);

— managers who use judgement to allocate, knowing that outcomes for delivery, utilization and workload will achieve acceptable tolerances (e.g. when delivery times are unconstrained).

Validation after matching decisions can occur periodically, such as in weekly resource meetings in a consultancy practice.

Comparing demand, capacity or availability and allocated work should be done quantitatively, period by period, and can be expressed as work and worker hours, days, weeks, months, headcount or FTE per day, week or month. Appropriate visualizations can optionally be used.

Validation should account for the uncertainty of work and worker or capacity information.

#### 7.6.2.5 Preventative actions

Organizations should document preventative actions that stop or mitigate undesirable outcomes that were identified by validation during the assign step. Undesirable outcomes are forecast outcomes that are unlikely to meet the organization's target outcomes (refer to Clause 7).

EXAMPLE A gap between work demand and allocated work can cause delivery issues, low utilization, excessive workloads or budget exceedances. For example, forecast utilization of 68 % would be undesirable if target utilization is 85 %.

Preventative actions within workforce allocation generally include finding work or workers inside or outside a unit or changing working hours. For suggested preventative actions, refer to Annex B.

The organization should determine the priority and order of preventative actions based on its characteristics, rules and policies.

Some medium- or longer-term actions could be workforce planning activities, e.g. recruiting additional workers (refer to ISO 30409).

If undesirable outcomes are a result of commitments from earlier allocation stages, such information should be fed back into those stages.

#### 7.6.2.6 Accept compromise

It is not always possible for all forecast outcomes to achieve target outcomes, even after preventative actions have been taken to mitigate their impact. Organizations will then potentially have to accept compromised outcomes, e.g. late delivery of products or services, low utilization or high workloads.

Organizations should document processes for accepting compromised outcomes and ways to actively manage their impact.

### 7.6.3 Step 3: Inform

#### 7.6.3.1 General

If an allocation stage involves an inform step, the way workers and stakeholders are informed of allocation decisions should be documented (e.g. printed reports posted at a specified spot on a wall, email, allocation systems). The inform step should precede commencement of the work by the amount of time defined by allocation horizon (if applicable).

Other stakeholders can also be informed at different points in time, which could be the same as when the workers are informed, but not necessarily.

EXAMPLE Project managers are often informed of the workers that have been assigned to their projects before the workers are. Functional managers will possibly need to be informed or consulted before their workers are allocated to projects, though ideally project allocation decisions are made jointly between project and functional managers.

NOTE Often functional managers have the clearest and broadest view of the demand pipeline (i.e. future allocations) for their workers. Project managers are often focused solely on the impacts to their projects. Workers, however, will possibly understand their current allocations, but not necessarily future work. Often, only their functional manager has this holistic view of their future work.

#### 7.6.3.2 Co-workers and privacy

Allocation information can be shared between workers within a unit, team, department or other groups of workers. Sharing of allocation information could particularly be required for self-allocation (e.g. for shift trading). If information is shared between workers, organizations should ensure privacy and personal information policies are followed. Any communication to a wider group of individuals should enable workers to know required information without providing inappropriate personal details.

#### 7.6.3.3 Allocation changes

Processes for allocation decision changes should be documented. In many allocation stages, decisions from previous stages will possibly need to be revised. Changes to allocation decisions after workers or stakeholders have been informed can have an impact. In some cases, there could be time limits after which changes trigger additional compensation.

### 7.6.4 Step 4: Respond

To avoid confusion or misunderstandings, workers will possibly need to confirm receipt and acceptance of the allocation information. In such cases, the way workers are required to respond should be documented. Confirmation will possibly have to be recorded and be traceable.

In addition to acceptance, workers could also be entitled to respond with rejection, alternatives, comments, queries or other information. Provision of sufficient time to address responses should be included in the process. In such cases, processes for dealing with each response should be documented.

Following confirmation of the allocation (implicit or implied), the worker then undertakes the assigned work.

## 8 System measurement

Methods for measuring the allocation system's past performance should be documented in accordance with the organization's goals and success factors (refer to 5.10). Measurements are to enable daily adjustments to the allocation activities and drive continual improvement to the system.

Measurement should include assessable parameters that identify improvement opportunities and the value these promote. These measures should align with functional teams, such as human resources, finance, governance and marketing, that have performance targets or key performance indicators that provide information to the organization about what effect they have or what challenges and constraints their functions face.

EXAMPLES

a) Schedule adherence – productive time spent in the workplace as a proportion of total allocated productive time.

b) Schedule performance – total time in the work environment as a proportion of total assigned or scheduled time.

c) Time to allocate – time it takes to allocate new work to workers.

d) Forecast demand accuracy – estimated demand compared with actual time worked.

e) Past utilization – actual time worked compared with capacity of workers.

Performance measures that reflect the expectations of the organization are an integral component of the continual improvement of workforce allocation.

## 9 Documentation and communication

The way organizations require information regarding workforce allocation processes, practices and policies is to be recorded and communicated and should be documented. This can include employee handbooks, policy manuals, webpages or other documentation. Such documentation should be communicated to and understood by workers, allocators, validators and stakeholders. Workers, allocators, validators and stakeholders should be advised why it was created, what the purpose is and how the document will be used in the organization. This also applies when updates to policies are being made.

Workers, allocators, validators and stakeholders should be familiar with the organization's policies and confirm this. More complex policies or procedural changes can require further training.

## 10 Continual improvement

A method for continual improvement of the workforce allocation framework and processes should be identified and documented. This can include regular reviews to ensure that processes are current and meet organizational needs. Such reviews should examine:

1) changes to the organization that impact workforce allocation (refer to Clause 5);

2) the adequacy of the workforce allocation framework and processes (refer to Clauses 6 and 7, respectively);

3) system measures (refer to Clause 8);

4) improvements that could be evaluated, implemented and documented.

Review of the framework and the processes should consider:

— Design: does the design of allocation processes meet its objectives and the underlying logic for why it will produce the intended change?

— Implementation: was the design implemented as intended?

— Impact: did the design produce the intended outcomes and impact?

Reviews should assess:

— Utility: can the review contribute to continual improvement of the framework and processes?

— Feasibility: are the evaluation procedures practical, given the time, resources and expertise available?

— Accuracy: are approaches at each step accurate, given stakeholder needs and evaluation purpose?

The organization's leadership should be informed of the assessment and actions that are intended to be taken to ensure the framework and processes remain current and drive greater effectiveness.

# Annex A
(informative)

# Characterizing work and workforce

## A.1 Characterizing work

For the purpose of workforce allocation, work and demand can be defined in different forms:

1) Tasks, i.e. the lowest level of work that becomes explicitly allocated. Below the task level, workers will determine their approach of carrying out the work themselves. Tasks can be:
   a) defined by a breakdown of larger pieces of work (e.g. projects, phases, deliverables); or
   b) directly related to business drivers (e.g. tasks for train drivers could be determined by a train timetable).
2) Estimates or forecasts, e.g. if tasks are not known at the level of the allocation stage.
3) Aggregations of work above the task level, e.g. subprojects, phases, deliverables, shifts.

Task-level work information should include:

— work name, description and ID;
— when the work is to be done (if there is a requirement), for example:
  — when it is to start and finish, e.g. shifts, windows, immediate execution;
  — when it is to be completed, e.g. project activity milestone or due dates;
— roles, skills and proficiencies needed to complete the work;
— demand for each task (refer to 5.3);
— other attributes needed to match workers and work, such as location (e.g. customer or delivery location), required mobility or physicality.

Information for work expressed in the form of estimates or forecasts should include:

— time or period (e.g. day, hour);
— roles, skills and proficiencies needed to complete the work;
— demand (for the given time and skills or roles), expressed period-by-period in units of FTE, minutes, hours or similar;
— other attributes as needed to match workers and work, e.g. location, required mobility, physicality.

Information for work at an aggregate level should include:

— aggregate name, description and ID;
— roles, skills and proficiencies needed to complete the aggregate work;
— demand (e.g. by skills or roles) in a form that is appropriate for the aggregate work;
— other attributes as needed to match workers and work, e.g. location (if location can be expressed at the aggregate level), required mobility, physicality.

NOTE There are scenarios where delivery time is not a constraint or demand cannot or has not been estimated. For unconstrained work (refer to 5.5), demand will possibly not be known or need to be known. If managers are confident that all target outcomes will be achieved, then they can match work to workers just using inherent manager validation. For example, if sales opportunities are abundant, a sales team could just work on sales opportunities in a priority order, completing what they can but never engaging all their potential customers. If work information relates to business drivers (e.g. train schedules driving the work for train drivers, or traffic information for delivery services), real-time information of such business drivers could be required for the purpose of allocation, in particular in the more immediate allocation stage(s).

## A.2 Characterizing workers

### A.2.1 General

For the purpose of workforce allocation, workers and capacity can be described by the following characteristics.

### A.2.2 Availability and preferences

For each allocation stage, availability could be constrained by:

1) the law and corporate agreements, e.g. maximum weekly working time;
2) employment contracts, e.g. weekly working time, part-time contracts (for internal workers or employees);
3) labour lease agreements (for external or contingency workers);
4) individual working time agreements, e.g. working days for part-time workers;
5) absence planning, e.g. results of annual leave planning, training planning;
6) other absences not under control of the organization, e.g. illness, doctors' appointments;
7) elements of flexibility (e.g. relief shifts or teams, stand-by duties).

Availability will possibly have to be confirmed by workers (e.g. students bidding for work). Availability information need not be more accurate than work information.

Within allocation decisions, previous allocations can reduce actual availability.

Allocation could consider worker preferences that would be advised by the workers. If applicable, workers should confirm their preferences for work in terms of, for example, number of hours, days off, preferred timing, type of work, extra hours, location. Organizations can decide which preference, if any, is applied or considered. Any changes to preferences should be advised by the workers.

### A.2.3 Roles, skills, authorities and restrictions

Workers' characteristics should be documented and segmented into units by their roles and skills. At the level of a unit, roles and skills can be further differentiated by, for example, experience, knowledge of equipment and machinery, proficiencies or skill levels, past performance and authorizations (e.g. certificates). Furthermore, there could be restrictions for allocation (e.g. pregnant women who must not have irregular working hours).

Capturing and exploiting such data can be subject to legal restrictions (e.g. data protection) or other restrictions (e.g. corporate labour agreements).

Workers' temporary or permanent restrictions (physical, sensory, cognitive) should be identified, documented and taken into consideration for the type of work that could be allocated. Collection, dialogue and treatment of such information should be carried out in an equitable and respectful manner, while ensuring privacy requirements are met.

### A.2.4 Other information

Other worker information can be documented, such as location information, as required by the allocation process, such as the workers' base location(s), their current location (e.g. for trucker drivers) and mobility (e.g. for sales staff).

Beyond that, other attributes should be captured as required by the specific allocation process (e.g. gender when staffing airport security checks).

# Annex B
(informative)

# Preventative actions

Organizations should document preventative actions that stop or mitigate undesirable outcomes that were identified by validation during the assign step. Undesirable outcomes are forecast outcomes that are unlikely to meet the organization's target outcomes (refer to Clause 7).

For example, a gap between work demand and allocated work for an allocation unit can cause delivery issues, low utilization, excessive workloads or budget exceedances. For example, forecast utilization of 68 % would be undesirable if target utilization was 85 %.

The organization should determine the priority and order of preventative actions by its characteristics, rules and policies. Potential workforce allocation preventative actions are described in Table B.1.

**Table B.1 — Potential preventative actions**

| Circumstance | Preventative action for units |
|---|---|
| a) Some workers are over-allocated work while others are under-allocated work | 1) Re-allocate work from workers who have been overallocated work to workers who have been under-allocated |
| | 2) Split work between people (e.g. more than one person working on an activity, formal job sharing) |
| b) A unit has a deficit of workers | 3) Increase allocated working hours, within overtime limits |
| c) A unit has a surplus of workers | 4) Reduce allocated working hours, within utilization targets |
| d) Some units have a surplus of workers, while others with the same worker or work characteristics have a deficit in workers | 5) Share or float[a] work and workers between units (across the organization) (e.g. temporary internal transfer, multi-business unit contributions to projects) |
| After preventative actions 1 to 5 | |
| e) Unit has residual deficit of workers | 6) Reduce total demand[a] (e.g. increase activity or products needed, accelerate delivery time) |
| | 7) Increase capacity[a] and allocate new workers (recruit or contract more workers into the organization) |
| f) Unit has residual surplus of workers | 8) Increase the total demand[a] and allocate unused workers (e.g. reduce activity or products needed, slow delivery time) |
| | 9) Reduce capacity[a] (furlough or exit workers, suspend or cease the use of contractors from the organization) |
| NOTE Other workforce planning type actions have not been included, e.g. developing capability within an organization. | |
| [a] Workforce planning type actions, not strictly within the scope of workforce allocation processes. | |

# Annex C
(informative)

# Workforce allocation examples

## C.1 Airline operations — Pilot workforce

### C.1.1 Characteristics

The work covered is the allocation of various pilot roles (second officers, first officers and captains) to flying duties across a number of various aircraft types. The workers are effectively full-time and have a minimum and maximum number of hours that can be assigned within the various legal constraints. The workforce is approximately 2 500 staff.

### C.1.2 Breakdown in units

The core unit structure for allocation is by aircraft type. The workers are limited to the aircraft type but can work in roles lower than their current position where valid, for example a captain can work in a first officer role, but not vice versa.

### C.1.3 Key objectives and success measures for the allocation

The key objectives and success criteria are:

— Ensure all appropriately qualified and current pilots are allocated to the planned services.

— Ensure pilots are allocated hours within the minimum and maximum working time targets.

— Ensure appropriate levels of reserve crews to mitigate against unplanned shrinkage and operational changes.

Table C.1 shows the information flow for the allocation process.

**Table C.1 — Information flow for airline pilots**

| | Decision stage | Stage 1 (roster) | Stage 2 (pre-day of ops allocation) | Stage 3 (day of ops allocation) |
|---|---|---|---|---|
| **Prepare (inputs)** | Data | — Named headcount with skills in which base location<br>— Leave, absence, training<br>— Planned flight schedule<br>— Staff working bids | — Named roster<br>— Late leave, absence, training<br>— Live flight schedule | — Named roster<br>— Late absences<br>— Live flight schedule |

**Table C.1** *(continued)*

| | Decision stage | Stage 1 (roster) | Stage 2 (pre-day of ops allocation) | Stage 3 (day of ops allocation) |
|---|---|---|---|---|
| | Rules | — Staff labour agreements<br>— Standard operating procedures (rostering)<br>— Fatigue and safe work guidelines<br>— Aviation regulations | — Staff labour agreements<br>— Standard operating procedures (rostering)<br>— Fatigue and safe work guidelines<br>— Aviation regulation | — Staff labour agreements<br>— Standard operating procedures (rostering)<br>— Fatigue and safe work guidelines<br>— Aviation regulation |
| | Stakeholders | — Staff<br>— Flight ops leadership team<br>— Workforce planning team<br>— Training team<br>— Roster committee (semi-regular)<br>— Employee representatives (where applicable) | — Staff<br>— Flight ops leadership team and base managers<br>— Near term resource planning team<br>— Training team<br>— Airline integrated operations team | — Staff<br>— Airport customer experience managers<br>— Crew ops control allocators<br>— Airline integrated operations team |
| **Assign (match)** | Allocator | — Workforce planning analyst | — Crewing operations planner | — Crewing ops controllers |
| | Validator | — Workforce planning manager | — Crewing operations manager | — Crew operations manager<br>— Airline operations duty manager |
| | Horizon/ [period] | — 1 (to 4 weeks) [period: 28 days] | — 1 to 7 days prior to the day of operations | — +1 min to 24 h – cyclical continuous |

**Table C.1** *(continued)*

| | Decision stage | Stage 1 (roster) | | Stage 2 (pre-day of ops allocation) | Stage 3 (day of ops allocation) |
|---|---|---|---|---|---|
| **Inform (output)** | Worker | Horizon/ [period] | — 1 (to 4 weeks) [period: 28 days] | — 1 to 7 days prior to the day of operations | — +1 min to 16 h |
| | | Information | — Named roster with operating flights (dates) accessed through online portal | — Published changes to staff rosters through online notification | — Flight assignment notified through online portal |
| | Stakeholder (leadership team/net-work scheduling/ IOC) | Horizon/ [period] | — 1 (to 4 weeks) [Period: 28 days] | — 1 to 7 days prior to the day of operations | — +1 min to 24 h |
| | | Information | — Named roster with operating flights<br>— Skill shortfall and training requirements<br>— Unfilled open flights | — Update roster with changed flights<br>— Overtime approvals<br>— Recommended schedule changes | — Flight assignment<br>— Approved attendance |

## C.2 Agile project teams

### C.2.1 Characteristics

Individuals are allocated to a team, and the team is assigned to deliver a product. Features for the product are developed in 2-to-3-week increments via prioritized work items called user stories, which are assembled in a product backlog by a product owner. The team either collectively allocates user stories to team members based on skill needs and/or individual preference, or the team members self-allocate stories to themselves.

### C.2.2 Breakdown in units

Agile projects are self-managed by teams. Teams can be populated from pools of workers. In a pure agile environment, workers are assigned full time to a team. In many organizations, however, a hybrid agile–waterfall environment exists, so workers can be partially assigned to one or more teams.

### C.2.3 Key objectives and success measures for the allocation

The key objectives and success criteria are:

— Ensure teams have the proper talent to execute the user stories.

— Avoid allocating workers to “tasks” – teams are self-managing.

— Employ an agreed-upon method of determining relative user story size (in terms of points), as story points are the primary measure of how much can be accomplished in each iteration.

Table C.2 shows the information flow for the allocation process.

**Table C.2 — Information flow for agile project teams**

| | Decision stage | Stage 1 (allocated to team) | Stage 2 (assign team to project) | Stage 3 (execution of work) |
|---|---|---|---|---|
| **Prepare (inputs)** | Data | — Worker capacity/ availability<br>— Worker skills/fit<br>— Team needs | — Team capacity/ availability<br>— Project information<br>— Desired release date<br>— Product backlog<br>— Worker skills | — Team capacity/ availability<br>— Project information<br>— Target release date<br>— Product backlog (features/stories)<br>— Sprint schedule (e.g. 2-week sprint, 3-week sprint) |
| | Rules | — Allocate worker to team, max 100 %<br>— In hybrid environment, worker can be partly allocated to one or more teams and/or allocated to non-agile projects | — Assign team to a project for product release delivery | — Team allocates user stories to workers from the prioritized product backlog<br>— Work is delivered in iterations<br>— Worker performance feedback can be provided to worker and/or worker's functional manager, and new skills added to the worker's repertoire |
| | Stakeholders | — Functional manager<br>— Product owner | — Functional manager<br>— Product owner<br>— Project manager (if applicable)<br>— End customer | — Product owner<br>— End customer |
| **Assign (match)** | Allocator | — Functional manager<br>— Product owner | — Functional manager<br>— Product owner | — Team or team member |
| | Validator | — Product owner | — Product owner | — Product owner |
| | Horizon/ [period] | — 1 month to 1 week | — 1 month to 1 week | — +1 min to 24 h – cyclical continuous |

| | | | | | |
|---|---|---|---|---|---|
| **Inform (output)** | Worker | Horizon/ [period] | — 1 month to 1 week | — 1 month to 1 week | — +1 min to 24 h – cyclical continuous |
| | | Information | — Team name, product owner, duration of assignment, percentage of allocation to team | — Project information, customer name, features desired, desired release date | — User story information |
| | Stakeholder | Horizon/ [period] | — 1 month to 1 week | — 1 month to 1 week | — Stakeholders are informed of status during sprint demos at the end of each sprint |
| | | Information | — Duration and allocation percentage of worker assignment to team<br>— Team responsibilities | — Project sprint and release schedule, project communication protocols | — Newly designed features, recommended alterations |

## C.3 Waterfall project team

### C.3.1 Characteristics

An engineering joint venture provides design and engineering services to a government authority for a programme of projects in a cross-functional organization of projects and disciplines. Work is structured by projects, work packages (WPs), lots, phases and tasks and estimated by role per task per week (using spreadsheets). In this example there are 1000 workers defined by primary role, other roles and skills. Stakeholders are government authority, joint venture (JV) board, procurement, project leadership, HR and partners. Resource management is centralized from the programme management office working with discipline leads and lot leads.

### C.3.2 Breakdown in units

Pool sourced from all partners. Unit 1: JV workforce. Unit 2A: roles. Unit 2B: role/work package. Unit 3: roles/lot. Unit 4: people assigned tasks.

### C.3.3 Objectives and success factors

Unit 1: < 10 % people assigned > 44 h per week; > 75 % people assigned > 36 h per week. Unit 3: delivery 95 % to 110 % (total role capacity/demand), utilization: 80 % to 120 % (total role allocation/capacity); workload: 80 % to 120 % (total role demand/allocation).

Table C.3 shows the information flow for the allocation process.

**Table C.3 — Information flow for waterfall project team**

| | | Decision stage | Stage 1 (work package assignment) | Stage 2 (lot/phase assignment) | Stage 3 (task assignment) |
|---|---|---|---|---|---|
| **Prepare (inputs)** | | Data | — WP role demand<br>— Resource's capability + availability | — Lot/phase role demand<br>— Resource capability + availability | — Task + task demand |
| | | Rules | — Workers from procured partners<br>— Selected on value for money<br>— 40 h per week max.<br>— Leave by end date | — Must be WP approved | |
| | | Stakeholders | — Partners, government authority<br>— Discipline lead | — Lot lead | |
| **Assign (match)** | | Allocator | — Procurement (to source partners) | — Discipline lead | — Lot leader |
| | | Validator | — JV resource manager | — JV resource manager | — JV resource manager |
| | | Horizon/[period] | — 3 weeks [WP duration] | — 2 weeks [lot duration] | — 2 days [task duration] |
| **Inform (output)** | Worker | Horizon/[period] | — 3 weeks [WP duration] | | — 2 days |
| | | Information | — WP, engagement start, finish date | — Lots, deadlines | — Tasks, deadlines |
| | Partner | Horizon/[period] | — 2 weeks | | |
| | | Information | — WP, engagement start, finish date | | |
| | Commercial | Horizon/[period] | | | |
| | | Information | — Resource name, end date | | |
| | Lot lead | Horizon/[period] | | — 2 weeks | |
| | | Information | | — Resource name, end date | |



## C.4 Production — Manufacturing workforce

### C.4.1 Characteristics

In manufacturing, the allocation of work needs to ensure production volumes and production or delivery goals. The workforce typically consists of regular and casual or agency workers. Regular workers typically work full time on master schedules in shifts of fixed length (e.g. 8 h), potentially including night and weekend work. Workers typically have different skills and proficiency levels for certain manufacturing activities.

### C.4.2 Breakdown in units

Production often involves a sequence of manufacturing steps performed in the different departments and sites (and sometimes suppliers). The core unit structure is by manufacturing site and department. The manufacturing workforce can include functions such as machine operators, supervisors, helping hands and staff responsible for machine changeover. Staff are sometimes cross-skilled to work in different functions and/or departments.

### C.4.3 Key objectives and success measures for the allocation

The key objectives and success criteria are:

— Ensure that production schedules and/or production targets are met.

— Ensure that delivery deadlines are met and machine utilization is maximized.

— Ensure equitable and fair allocation for incentivized tasks and prolonged periods of work.

Table C.4 shows the information flow for the allocation process.

**Table C.4 — Information flow for manufacturing**

| | Decision stage | Stage 1 (shift plan review) | Stage 2 (workplace assignment) |
|---|---|---|---|
| **Prepare (inputs)** | Data | — Production schedule/ target production volumes<br>— e.g. seasonal forecasts and calamities<br>— Worker availability as by master roster – by skill and proficiency level<br>— Absences<br>— Potential availability of casual workers (by skill/ proficiency) | — Production schedule/ target production volumes<br>— Overtime requirements<br>— Worker day-to-day availability by skill and proficiency level<br>— Potential availability of casual workers (by skill/proficiency) |
| | Rules | — Labour law<br>— Tariff and corporate/ unit-specific labour agreements | — Labour law<br>— Tariff and corporate/ unit-specific labour agreements |
| | Stakeholders | — Production planning and control<br>— Team leads, department managers, shift supervisors<br>— Employee representatives (where applicable) | — Team manager<br>— Shift supervisor<br>— Production manager |
| **Assign (match)** | Allocator | — Team or department manager | — Team manager |
| | Validator | — Department or production manager | — e.g. shift supervisor |
| | Horizon/[period] | — e.g. 2 weeks/period 1 week | — e.g. in the beginning of the shift for the complete shift |