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Mentoring Newcomers in Aviation Ground Handling: A Narrative Review of Guided Practice, Reciprocal Learning and Procedural Fidelity

Onur Kan Ödeş*

Independent Researcher, Altıntaş Mahallesi, Aksu, Antalya, Türkiye

*Corresponding author: onurkan88@hotmail.com

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Abstract

Ground handling organizations absorb large intakes of new employees, often at the start of the summer season, into work where a small deviation from procedure can damage an aircraft or injure a colleague. Much of what these newcomers learn comes from experienced coworkers on the apron, which makes mentoring both a learning resource and a channel through which unapproved local routines can spread. This narrative review asks what recent research on onboarding, mentoring and intergenerational knowledge transfer offers ground handling, and which safeguards its application requires. Fourteen sources published between 2021 and 2026 were selected in four steps against stated criteria and synthesized thematically. The literature favours structured, supported learning on the job, yet the certainty of intervention evidence is low and almost none of it comes from aviation. Studies of rapport and knowledge seeking show that knowledge moves in both directions and that asking for help carries a social cost. Analyses of ground operations occurrences repeatedly identify failure to follow prescribed procedures. The review integrates these strands into a four-part mentoring framework: competence-based mentor selection, explanation tied to the applicable instruction, a graded learning record, and a clarification route for discrepancies between observed practice and documented procedure. For ground handling organizations, the framework offers a low-cost way to build mentoring into existing training, assessment and safety reporting arrangements while preventing local habits from passing as approved methods. It is offered for empirical evaluation.

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Introduction

Ground handling sits at the point where an airline's plan meets the physical aircraft. Loading and unloading, pushback, coordination of fueling, passenger boarding and the movement of ground support equipment all take place within a turnaround window that is short, visible to the customer and

unforgiving of delay. The work is labour intensive, it is carried out close to aircraft, vehicles and moving equipment, and it is performed by teams whose composition changes with the season and the shift pattern. This combination explains why the way newcomers learn the job is not a matter of human resource administration alone. It is a question about how an

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organization reproduces safe practice from one intake to the next.

Workforce conditions make the question pressing. An industry survey reported by the International Air Transport Association (IATA, 2023) found that 60% of responding ground handling professionals felt they did not have enough qualified staff to ensure smooth operations, and that 37% expected shortages to continue until the end of 2023 or beyond. Sobieralski and Hubbard (2023) describe how the pandemic and the recovery that followed disrupted the air transport workforce, ground handlers included and argue that higher wages alone could not resolve the resulting staffing problems. When experienced staff leave and recruitment accelerates, the ratio between those who know the operation and those who are still learning it deteriorates, and informal guidance on the apron carries a larger share of the training load.

Regulation is moving in the same direction. Commission Delegated Regulation (EU) 2025/20 lays down requirements for ground handling services and the organizations providing them, and Commission Implementing Regulation (EU) 2025/23 sets the corresponding requirements for the competent authorities that oversee them (European Union Aviation Safety Agency [EASA], 2025). Among the organizational requirements is a training and assessment programme for personnel (ORGH.TRG.100). The acceptable means of compliance (AMC) and guidance material (GM) issued by EASA address training on the job (GM1 ORGH.TRG.100(b)(6)) and refer specifically to mentors (GM1 ORGH.TRG.100(i)). Mentoring is therefore ceasing to be a matter of local custom and is becoming part of the formal arrangements through which, an organization builds and demonstrates competence.

Safety evidence adds a further reason for attention. In an analysis of 87 accident and incident reports involving ground operations, Muecklich et al. (2023) identified lack of situational awareness and failure to follow prescribed procedures as the dominant causal factors. In a ground handling company operating 32 stations, Rodoplu Şahin and Ödeş (2026) reviewed 1,930 occupational accident records and found that loading, work below the wing and unloading accounted for 43% of accidents, with peaks in the summer months. Neither study examined mentoring, and neither shows that newcomers cause accidents. Taken together, however, they place risk in the tasks and the season in which, in markets with strong seasonality, the share of new staff on the apron is typically at its highest.

Mentoring cuts both ways in this setting. An experienced colleague can explain why the team waits for the anticollision beacon to go off before approaching the aircraft, how to read a team leader's intention during a tight turnaround, or when to stop and ask. The same colleague can also pass on a sequence

that differs from the airline's instruction, a habit formed under time pressure, or a practice that is correct for one carrier and wrong for another. Ground handlers commonly serve several airlines at the same station, each with its own requirements layered on common industry standards, so the phrase "this is how we do it here" may be accurate for one aircraft and unsafe for the next. The organizational problem is how to share experience without allowing informal practice to displace the applicable procedure.

Research on onboarding and mentoring has grown considerably, but its evidence comes mainly from nursing, professional services, education and office work. Aviation training research, for its part, concentrates on pilots, air traffic controllers and maintenance engineers. Ground handling staff, a large and often seasonal part of the aviation workforce, are seldom the subject of either literature. This review addresses that gap by reading recent organizational and educational research through the operational realities of ground handling. Its novelty lies in treating mentoring as the point at which approved procedure and local practice meet. Onboarding research asks whether newcomers adjust, and ground operations safety research asks why procedures are not followed; to the author's knowledge, no review has joined these two questions for ground handling or shown how mentoring can be placed inside the training and safety management arrangements that now govern the sector.

1.1. Conceptual lens

Two established ideas from the study of learning frame the analysis. Kram (1985) distinguished the career functions of mentoring, such as coaching, exposure and challenging assignments, from its psychosocial functions, such as role modelling, acceptance and counselling. On the apron, the career functions correspond to guided exposure to tasks of increasing responsibility, while the psychosocial functions shape whether a newcomer feels able to admit uncertainty. Lave and Wenger (1991) described learning as legitimate peripheral participation, in which newcomers move from the edge of a community of practice towards full membership by doing real work that gradually becomes more central. A new loader who begins by handling baggage under supervision and is later trusted to position equipment at the aircraft or to lead a loading team follows exactly this path. The same account also explains the risk: what newcomers absorb is the practice of the community as it actually is, which may differ from the practice described in the manual.

Safety science adds a third idea, concerned with the status of procedures. Reason (1997) observed that violations are often routine rather than exceptional: shortcuts become part of how a group normally works, particularly when a rule appears unnecessary and the shortcut has not yet produced harm. Hale

and Borys (2013a) contrasted two models of rules. In the first, rules are written by specialists and imposed on operators, and deviation is a failure to be suppressed. In the second, rules grow out of practice and competent operators adapt them to local conditions. Their companion paper argues that organizations need a process in which rules are monitored in use and revised when practice shows them to be wrong or unworkable (Hale & Borys, 2013b). Sedlar et al. (2023), reviewing studies of the normalization of deviance in high risk industries, identified production pressure, culture and the absence of negative consequences as linked conditions under which deviation comes to be accepted.

Aviation research has drawn the same distinction in its own terms. Degani and Wiener (1994) separated the procedures an operator prescribes from the practices crews actually follow and argued that procedures derived from a coherent philosophy and set of policies are more consistent and more likely to be followed. In aircraft maintenance, McDonald et al. (2000) found that compliance with task procedures did not differ across four organizations whose safety management systems did and pointed to a strong professional subculture shared by technicians across those organizations. If procedural habits belong to an occupational community rather than to a single employer, the route by which they pass from one worker to the next deserves as much attention as the written procedure. Mentoring sits where these accounts meet. A mentor passes on both the written rule and the local adaptation, and a newcomer usually cannot tell them apart. This review takes the position that a local adaptation becomes legitimate only when it has passed through the organization's own process for reviewing and changing procedures.

In this review, tacit knowledge means experience based understanding that is difficult to express fully in a written instruction, such as recognizing that a situation is no longer routine or judging when an operation should be stopped until something is clarified. The definition is a working one. It does not give tacit knowledge any authority over approved instructions.

Two further terms are used in a specific sense. A newcomer is a person new to the organization, the station or the task, whatever their age. A mentor is an employee who holds current competence in the task and has been assigned to support a newcomer; the role rests on task experience, not on age or length of service. Following Rudolph et al. (2021), age, organizational tenure and task experience are treated as separate attributes. Some of the studies reviewed below define their groups by age, as older and younger employees. Their findings are used here for what they reveal about exchanges between a more and a less experienced colleague, and the review does not assume that the experienced party on the apron is the older one.

1.2. Research questions

Three questions guide the review:

RQ1. What does recent research on onboarding and mentoring indicate about how newcomers learn in operational work?

RQ2. What does research on workplace relationships and intergenerational knowledge transfer indicate the conditions under which experienced and new employees exchange knowledge?

RQ3. What safeguards are needed to mentor in ground handling transfers operational judgement without reproducing unverified local routines?

The review contributes to research on workplace learning by extending it to a safety critical service sector that has received little scholarly attention, and it offers practitioners a framework that can be tested in practice.

2. Methodology

2.1. Design

A narrative review design was chosen because the relevant evidence is heterogeneous in method, setting and purpose, and because the aim was to interpret that evidence for a sector in which direct studies are scarce, rather than to estimate a pooled effect. The synthesis is critical in the sense that each source is read for what it can and cannot support. Every claim in the results is attributed to one of three evidential categories: published empirical or review findings, regulatory or industry guidance, and propositions developed by the author.

2.2. Search and selection

Searches were conducted in September 2026 through web searches of publisher platforms and bibliographic records. Search terms combined three groups: newcomer learning (onboarding, organizational socialization, newcomer, mentoring, reverse mentoring), knowledge exchange (intergenerational knowledge transfer, tacit knowledge, psychological safety) and setting (ground handling, ground operations, training). To keep the synthesis current, scholarly sources were restricted to works published from 2021 onward. Regulatory and industry documents were retrieved from the websites of EASA and IATA.

Sources were included when they (a) were peer reviewed empirical studies, systematic or critical reviews, quantitative syntheses or conceptual articles, or official regulatory or industry documents; (b) were published in English between 2021 and 2026; (c) addressed newcomer learning, mentoring, knowledge exchange between employees, speaking up at work, or human factors in ground operations; and (d) could be checked against a publisher page or indexing record for both

bibliographic details and the findings used here. Trade press, opinion pieces and sources whose details could not be verified were excluded. The classic works cited in Section 1.1 (Kram, 1985; Lave & Wenger, 1991) and the safety science and aviation sources used there to frame procedural compliance (Degani & Wiener, 1994; Hale & Borys, 2013a, 2013b; McDonald et al., 2000; Reason, 1997; Sedlar et al., 2023) provide the conceptual lens and are not counted in the corpus. The same applies to the Safety Management Manual of the International Civil Aviation Organization (ICAO, 2018), which is used in Section 3.7 to place the framework within safety management.

Selection proceeded in four steps. First, titles and abstracts returned by the searches were screened against criteria (a) to (c), and records that clearly fell outside them were set aside. Second, the remaining records were checked against a publisher page or indexing record under criterion (d); sources whose bibliographic details or reported findings could not be confirmed were excluded at this point. Third, each remaining source was assessed for its relevance to the three research questions. A source was retained when it informed at least one question directly, or when it documented the workforce, regulatory or safety conditions that make those questions

pressing in ground handling; sources of the second kind are labelled as context in Table 1. Fourth, where several candidates supported the same point, systematic reviews and quantitative syntheses were preferred to single studies, and aviation sources to sources from other sectors, so that each research question was covered without duplicating evidence. This sequence produced the fourteen sources in the corpus.

2.3. Corpus and analysis

Fourteen sources met the criteria: twelve scholarly works and two regulatory or industry documents (Table 1). Each source was read for setting, design, sample, principal finding and the limits on transfer to ground handling. The last column of Table 1 records the research question or questions that each source informs, which is the result of the relevance assessment in the third selection step. Findings were grouped deductively under the three research questions and inductively within them, which produced three themes: guided practice; relationships and reciprocal learning; and tacit knowledge and procedural fidelity. Where only the abstract or publisher summary of a source was accessible, the discussion is confined to what that summary reports.

Table 1. Sources in the review corpus

Source	Design and setting	Evidence base	Use in this review	RQ
Ashforth (2025)	Conceptual article; socialization into demanding occupations	Theory building from prior literature	Socialization normalizes whatever practice a community holds, desirable or not	RQ3
Bauer et al. (2025)	Review and quantitative synthesis; many sectors	256 studies	Socialization tactics and insider support relate to newcomer adjustment	RQ1
EASA (2025)	Consolidated regulations with AMC and GM; EU ground handling	Regulatory requirements and guidance	Training and assessment programme; guidance on mentors and on training on the job	RQ1, RQ3
Edmondson & Bransby (2023)	Review; teams and organizations	Research on psychological safety	Conditions for asking questions and raising concerns	RQ2
Frögéli et al. (2023)	Systematic review; mainly newly qualified nurses	5 studies, 1,556 new professionals; low certainty of evidence	Structured, supported training on the job had the strongest support	RQ1
IATA (2023)	Industry survey report; ground handling	Survey of ground handling professionals	Shortage of qualified staff; push for IGOM adoption and competency based training	Context, RQ3

Igoa-Iraola & Díez (2024)	Systematic review; managerial and intermediate positions	28 articles	Collective and communicative procedures for retaining knowledge	RQ3
Muecklich et al. (2023)	Document analysis; ground operations occurrences	87 accident and incident reports, 2000 to 2020	Situational awareness and procedural noncompliance as dominant factors	Context, RQ3
Pfrombeck et al. (2024)	Field study, three measurement points; older employees	764 employees aged 45 to 76	Seeking knowledge from younger colleagues brings learning and embarrassment	RQ2
Rodoplu Şahin & Ödeş (2026)	Retrospective case study; ground handling company	1,930 accident records, 32 stations	Accidents concentrated in loading and work below the wing; summer peaks	Context
Rudolph et al. (2021)	Critical review; organizational science	Conceptual and methodological critique	Age, tenure and task experience as distinct attributes	RQ2
Rui & Ju (2022)	Questionnaire survey; Chinese firms, several industries	318 respondents	Rapport and supportive climate relate to knowledge transfer	RQ2
Sobieralski & Hubbard (2023)	Policy paper; air transport workforce	Workforce disruption during pandemic and recovery	Staffing pressure on ground handling and other airport roles	Context
Zhang et al. (2023)	Four studies; mentoring relationships	Multiple samples	Mentors who value learning from below are more effective	RQ2

Note. Sources are listed alphabetically. RQ = research question; Context = source documents the workforce, regulatory or safety conditions of ground handling rather than answering a research question directly. AMC = acceptable means of compliance; EASA = European Union Aviation Safety Agency; GM = guidance material; IATA = International Air Transport Association; IGOM = IATA Ground Operations Manual.

2.4. Scope, reflexivity and ethics

The review is purposive. It does not claim exhaustive coverage, independent dual screening or formal appraisal of risk of bias. The author works in quality and safety management in the ground handling sector, and that experience informed the choice of operational examples. The examples are analytical illustrations rather than observations of any organization; no organizational records or employee data were used. Because only published material was analysed, ethics committee approval was not required.

3. Results and Discussion

3.1. Overview of the corpus

The corpus is small but varied. The corpus includes five reviews or research syntheses, one conceptual article, six other scholarly contributions, and two regulatory or industry documents. The scholarly contributions include empirical

studies, accident analyses, and a workforce policy paper. Only two scholarly sources deal with ground operations directly, and both concern accidents rather than learning (Muecklich et al., 2023; Rodoplu Şahin & Ödeş, 2026). None evaluates a mentoring intervention in aviation. That absence is itself a finding: the sector is adopting mentoring through regulation and practice ahead of evidence generated within it. According to Table 1, three sources inform RQ1, five inform RQ2, five inform RQ3, and four provide contextual evidence. Three sources contribute to more than one category.

3.2. Guided practice and the limits of onboarding evidence (RQ1)

Frögéli et al. (2023) reviewed evaluations of formal onboarding and found five eligible studies with 1,556 new professionals, most of them newly qualified nurses. Three of the five studies showed a statistically significant effect on newcomer adjustment, and structured and supported training on the job emerged as the strategy with the strongest support; the authors nevertheless rated the certainty of the evidence as

low. Bauer et al. (2025) took a wider view, synthesizing 256 studies of newcomer socialization. Their review associates structured socialization tactics and support from organizational insiders with better adjustment, expressed in indicators such as role clarity and social acceptance, which in turn relate to outcomes including commitment, performance and turnover intentions.

Read together, the two reviews point in a consistent direction while warning against overconfidence. Learning in the flow of real work, supported by people who already belong to the operation, matters more than the induction classroom on its own. The controlled evidence, however, is thin and comes from other occupations. It cannot tell a station manager how long a mentoring period should last or how many supervised turnarounds make a loader ready. The defensible inference is directional rather than prescriptive.

For ground handling, the first practical implication is to make the status of learning visible. A newcomer who has watched a pushback several times has not thereby learned to perform one. A learning record that separates three states, namely observed, performed with support, and demonstrated to the required standard, gives mentor, supervisor and learner a shared vocabulary. It also guards against a familiar organizational error, which is to treat attendance at an induction course or a count of shifts worked as proof of competence. The graded structure mirrors the movement from peripheral to full participation described by Lave and Wenger (1991), and it fits within the training and assessment programme that the European rules now require (EASA, 2025).

The second implication concerns the boundary between mentoring and assessment. Mentoring is a relationship in which questions and rehearsal are welcome; assessment is a formal judgement against specified criteria. At many stations, particularly smaller ones, the same experienced employee performs both roles. This is not a problem in itself, but the learner should always know which conversation is taking place. When the two are blurred, a newcomer may conceal uncertainty from a mentor who will later sign the competence record, and the psychosocial function that Kram (1985) identified disappears exactly where it is most needed. A mentoring arrangement also confers no authority to perform tasks beyond those for which the learner has been trained and authorized.

3.3. Relationships, voice and reciprocal learning (RQ2)

Rui and Ju (2022) surveyed 318 employees of Chinese firms in sectors including finance, information technology, manufacturing and energy. Dimensions of rapport between older and younger colleagues were associated with knowledge transfer from the former to the latter, and a supportive organizational climate moderated these relationships. As a

questionnaire study outside aviation, it establishes association rather than effect. Because its groups were defined by age, what carries over to the apron is the finding about the relationship between a more and a less experienced colleague, not a claim about age as such. Its value for the present argument lies in shifting attention from the content of what is taught to the quality of the relationship through which it passes.

Pfrombeck et al. (2024) reversed the usual direction of inquiry. Following 764 older employees across three measurement points over six weeks, they examined what happens when older workers seek knowledge from younger coworkers. Knowledge seeking was related to successful ageing at work through perceived learning, but it also operated through a countervailing pathway of embarrassment. Asking for help, in other words, can be useful and socially costly at the same time. On a ground handling team the person who needs to ask may be older or younger than the person who knows; what transfers is that seeking help has a social price for the one who seeks it. Zhang et al. (2023) take the point further. Across four studies they introduced the concept of learning direction, the extent to which people see value in knowledge held by those below them in a hierarchy, and found that mentors who valued insights from below approached mentoring as mutually beneficial and were more effective for their mentees.

Edmondson and Bransby (2023), reviewing more than two decades of research on psychological safety, describe a shared belief that it is safe to take interpersonal risks such as asking a question, admitting an error or raising a concern, and summarize its consistent association with learning behaviour and performance in teams. Rudolph et al. (2021) add a caution of a different kind. Their critical review shows that generational labels are weak explanations of attitudes and behaviour at work, and it supports treating age, organizational tenure and task experience as separate attributes. A recruit in their forties who arrives from retail may be a complete novice on the ramp, while a colleague in their early twenties with three seasons behind them may be the most competent person on a particular aircraft type.

These findings carry three implications for ground handling. First, the social cost of asking is amplified on the apron. Time pressure, noise, hearing protection, radio discipline and the authority of the team leader all make a question feel like a delay to the aircraft. A mentoring arrangement should therefore legitimize the question explicitly, for example by agreeing in advance that stopping to ask is expected rather than merely tolerated. Second, learning can and should run in both directions. A newcomer fluent in an electronic reporting interface may help an experienced colleague use it, while the experienced colleague explains the operational context needed to describe an event accurately. This is an illustrative division

of expertise, not an assumption about which age group holds which skill. Third, pairing decisions should follow demonstrated competence and the learning need, not seniority or age.

3.4. Tacit knowledge and procedural fidelity (RQ3)

Igoa-Iraola and Díez (2024) reviewed 28 articles on procedures for transferring organizational knowledge during generational change. They report that such procedures are concentrated in large companies, that digitalization is a critical enabler, that intraorganizational communication is the dominant channel, and that organizations prefer collective approaches to transferring both tacit and explicit knowledge. Because the review concerns managerial and intermediate positions, its findings transfer to operational ground handling only in general form. The relevant lesson is that knowledge retention depends on organizational arrangements, not only on individual willingness to share.

Ashforth (2025) supplies the mechanism that makes the ground handling case distinctive. His account of normalization explains how organizations bring newcomers to regard the extraordinary as ordinary: by creating a strong situation with high normative control, by providing a clear frame, by combining incremental exposure with immersion, and by routinizing the work. He also observes that the process is largely the same whether its goals and means are socially desirable or not. For ground handling this is the heart of the matter. The same socialization that allows a newcomer to take the noise, heat and pace of the apron in stride will also normalize whatever shortcuts the team has come to regard as standard. The finding of Muecklich et al. (2023) that failure to follow prescribed procedures is among the dominant factors in ground operations occurrences shows why this matters. Sedlar et al. (2023) describe the same drift across high risk industries, where production pressure and the absence of negative consequences allowed deviation to become accepted practice. A turnaround that usually ends on time and without damage supplies both conditions.

The multicarrier character of ground handling sharpens the problem. IATA (2023) has called on the industry to accelerate the global adoption of the IATA Ground Operations Manual (IGOM) in order to achieve worldwide operational consistency. Until that consistency is achieved, a large part of what an experienced colleague knows is knowledge of which rule applies to which customer. Such knowledge is valuable and tacit in the sense defined above. It is also precisely the kind of knowledge that becomes wrong when an airline revises its instructions and the revision does not reach the ramp.

Two safeguards follow. The first is a principle: a mentor's confidence and length of service are insufficient grounds for treating a local habit as a valid operating method. The second

is a route. When a learner notices a difference between a demonstrated sequence and the written procedure, the arrangement should allow that difference to be referred to the trainer or supervisor responsible and the current instruction to be verified before the practice is accepted. In the terms used by Hale and Borys (2013b), the route turns an individual doubt into an input to rule management: either the instruction is confirmed and the habit corrected, or the habit exposes a weakness in the instruction, and the instruction is revised through the proper channel. This protects the learner from having to choose between loyalty to an influential colleague and adherence to the documented process. It also links mentoring to the safety management system. A recurring question signals something about the procedure, the training or the conditions of work, and should be handled as hazard information rather than filed as a note on the employee. The European guidance, by placing mentors within the training and assessment programme (EASA, 2025), supports treating the mentor as part of the organization's-controlled system of competence rather than as a private channel of advice.

3.5. Comparing the three themes

The three themes differ in what they examine and in how far their evidence can be trusted. Guided practice concerns the individual learner's progression and rests on the broadest evidence base, two reviews that together draw on more than 250 studies, although the intervention evidence is of low certainty and comes from other occupations. Relationships and reciprocal learning concern the pair or the team; the evidence is mostly correlational and drawn from offices and professional work, but it points the same way across settings. Procedural fidelity concerns the organization and its rules. It rests on a conceptual account of socialization and on occurrence analyses taken directly from ground operations, which makes it the theme most closely tied to aviation and the one least tied to learning outcomes.

The themes also qualify one another. Guided practice without attention to procedural fidelity can speed the spread of a local habit, because a well supported newcomer learns faster whatever is being taught. Good relationships make transfer easier, yet the same rapport raises the social cost of questioning a respected colleague's method, and this is where the second and third themes meet (Ashforth, 2025; Pfrombeck et al., 2024). Procedural fidelity pursued without relationships produces compliance without understanding and leaves the newcomer unable to recognize when a situation has stopped being routine. The themes are therefore interdependent rather than additive, and each component of the framework below is designed to close a gap that one theme alone would leave open. Components 1 and 3 give guided practice its structure and make its progress visible, component 2 ties that practice to the

applicable rule, and component 4 relieves the mentoring relationship of having to settle disagreements about procedure.

existing training and assessment programme, with responsibilities agreed before use, and they are offered for evaluation rather than as validated practice.

3.6. A mentoring framework for evaluation

Table 2 sets out four components developed by the author from the three themes. They are designed to operate within an

Table 2. A four part mentoring framework proposed for evaluation

Component	Purpose	Practical content	Basis in the review	Proposed process indicator
1. Competence based selection and assignment	Ensure that the mentor's knowledge is current and that there is time to teach	Mentor holds current competence in the task; assignment names availability and a substitute contact; roster allows explanation during work	Bauer et al. (2025); Zhang et al. (2023); EASA (2025)	Share of assigned mentoring shifts in which mentor and learner worked together
2. Explanation tied to the applicable instruction	Connect each demonstration to the rule that governs it	Mentor names the instruction and the carrier it applies to; learner explains why a step matters and when to stop and ask; short debrief after the task	Frögéli et al. (2023); Lave & Wenger (1991); Muecklich et al. (2023)	Proportion of planned debriefs completed
3. Graded learning record	Make the status of learning visible and keep it across shift changes	Objective, task, feedback and next review point; each task marked as observed, performed with support, or demonstrated	Frögéli et al. (2023); Kram (1985)	Time from first observation to demonstrated competence, by task
4. Clarification route and review	Prevent unverified local practice from being passed on	Discrepancies referred to trainer or supervisor; current instruction verified; recurring questions fed into training review and hazard reporting	Ashforth (2025); Edmondson & Bransby (2023); Hale & Borys (2013b); Igoa-Iraola & Díez (2024)	Discrepancies raised and time to resolution

Note. The components and indicators are propositions developed by the author from the reviewed literature and have not been validated.

Two design choices deserve emphasis. The first concerns time. In peak season, the mentor's roster is usually the binding constraint; naming a mentor without rostering time for explanation turns the arrangement into a label. The indicator for the first component therefore records whether mentor and learner actually worked together, not merely whether a mentor was assigned. The second concerns the record. It should hold only what is needed for learning and competence management, so that it supports continuity across shifts and supervisors without becoming a file of personal observations.

The proposed indicators describe process, not outcome. Accident counts alone would be an inadequate short term measure of the framework, because the mechanism it addresses is learning and because reporting behaviour and operational exposure can change independently of any training intervention. Outcome evaluation should follow only once the process is shown to be feasible.

3.7. Links to existing training and safety management arrangements

The framework is meant to work through arrangements that a ground handling organization already operates or, within the European Union, will be required to operate. Table 3 shows where each component attaches to the training and assessment programme, to the safety management system and to internal safety reporting. The safety management links follow the structure set out by ICAO (2018), in which training and education and safety communication belong to safety promotion, hazard identification belongs to safety risk management, and performance monitoring belongs to safety assurance. The European rules carry the same elements into the management system and safety reporting requirements for ground handling organizations (EASA, 2025).

Table 3. Alignment of the framework with existing training and safety management arrangements

Component	Training and assessment arrangement	Safety management link	What the component adds
1. Competence based selection and assignment	Qualification and competence of trainers and assessors (AMC1 and AMC2 ORGH.TRG.100(i)); guidance on mentors (GM1 ORGH.TRG.100(i))	Safety promotion: training and education (ICAO, 2018)	Mentor time treated as rostered capacity; substitute contact named
2. Explanation tied to the applicable instruction	Training on the job (GM1 ORGH.TRG.100(b)(6)); airline instructions and IGOM where adopted	Safety promotion: safety communication (ICAO, 2018)	Each demonstration names the instruction and the carrier it applies to
3. Graded learning record	Documents and records system (AMC1 ORGH.DOC.100); recurrent training and assessment (AMC1 ORGH.TRG.100(d))	Safety assurance: monitoring through process indicators (ICAO, 2018)	Intermediate states between first exposure and formal assessment
4. Clarification route and review	Review of training content; monitoring and revision of rules (Hale & Borys, 2013b)	Hazard identification (AMC1 ORGH.MGM.200(b)(2)(ii)); nonpunitive internal safety reporting (AMC1 ORGH.GEN.165)	A defined route that does not depend on the learner challenging the mentor

Note. Rule references are to the AMC and GM for organization requirements in EASA (2025). Safety management components follow ICAO (2018). The alignment is proposed by the author and has not been validated. ICAO = International Civil Aviation Organization.

Seen against these arrangements, the framework adds little new machinery; it mainly changes what existing elements record and whom they connect. The graded learning record gives the period between first exposure and formal assessment a documented structure, so that an assessor sees how a newcomer reached the point of assessment and not only the result. The clarification route turns the mentoring relationship into a source of hazard information. A question about why a demonstrated sequence differs from the written one is, in safety management terms, a report of a possible gap between work as prescribed and work as performed, and it belongs in the same nonpunitive channel as other safety reports. Handled in this way, mentoring becomes one of the means by which an organization monitors its own procedures, which is the function that Hale and Borys (2013b) assign to rule management.

3.8. Implementation with limited training resources

Many stations, particularly small and seasonal ones, have no trainer on site for much of the day and little administrative support. The framework can be scaled to such conditions without losing its safeguards. First, effort can be concentrated where consequences are greatest: the full arrangement can be applied to loading, unloading and work below the wing, where

accidents concentrated in the evidence reviewed here (Rodoplu Şahin & Ödeş, 2026), and to pushback and marshalling, where an error can damage the aircraft, with a lighter version for other tasks. Second, the graded record needs no new software; a single page added to the existing form for training on the job, with the three states marked by the mentor and countersigned at assessment, is sufficient. Third, the clarification route can be pooled. A small station can direct discrepancies by telephone to a duty trainer at a larger station in the same region, who checks the current instruction against the document library and replies within the shift. Fourth, debriefs can be folded into the briefings already held at the start of a shift or after a turnaround, and recurring questions can be submitted through the existing safety reporting channel instead of a separate form. What cannot be reduced is rostered overlap between mentor and learner; without it, the other components lose their basis.

3.9. Implications for practice and research

For station and training managers, the review suggests treating mentor time as a planned resource in seasonal workforce planning, selecting mentors on current competence and communication rather than seniority, and briefing mentors that personal preferences are not requirements. For auditors and

oversight bodies, it suggests asking not only whether a training and assessment programme exists, but how informal guidance on the apron is connected to the documented procedure.

For researchers, the review points to three requirements for empirical work. Studies should distinguish age from job experience, document the amount of support each newcomer actually received, and obtain ethical and organizational permission before collecting employee data. Qualitative work on how newcomers experience the tension between a trusted colleague's practice and the written procedure would also add a perspective that the current literature lacks.

3.10. Limitations

The corpus is small and purposively selected, the searches were web based rather than conducted through a registered database protocol, the number of records at each selection step was not logged, and neither dual screening nor formal quality appraisal was performed. Most of the empirical evidence comes from settings outside aviation, and the two ground operations studies concern accidents rather than learning. Several sources were consulted through their abstracts or publisher summaries. The European guidance supplies expectations rather than causal evidence and applies directly only within its jurisdiction. Finally, the author's professional background may shape interpretation; labelling each claim by its evidential category is intended to make that influence visible.

4. Conclusions

Mentoring in ground handling is best understood as a supported process through which newcomers learn to apply approved instructions and to seek clarification when practice and procedure diverge. Recent research gives good reason to invest in guided practice, respectful relationships and learning in both directions, but it leaves the effectiveness of mentoring in this sector unproven. The same social processes that make mentoring powerful also allow unverified routines to spread, and the multicarrier environment of ground handling makes that risk sharper than in most workplaces.

The review's contribution is to draw a clear line between passing on operational judgement and reproducing local habit, and to translate that line into four components that a ground handling organization can build into its existing training and assessment programme and safety reporting arrangements at modest cost. The framework is a basis for evaluation; it is not evidence of improved safety performance.

Empirical validation is the necessary next step, and a staged approach is recommended. A feasibility study covering one seasonal intake at a few stations of different size should come first, followed by a comparison between stations that adopt the framework and stations that do not, using the process

indicators in Table 2 together with time to demonstrated competence and newcomers' own accounts of whether asking was possible. Only when such evidence exists should the framework be judged by its effect on safety outcomes.

Declarations

Competing Interests

The author declares no conflict of interest.

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Data Availability

No new data were generated or analysed. All sources used in the review are listed in the references.

Declaration of Generative AI and AI-Assisted Technologies in the Manuscript Preparation Process

During the preparation of this revision the author used Claude (Anthropic) to support language editing and the checking of reference formatting against APA 7. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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