

02 The Last 300 mm *Rule*™

*A load may travel twenty metres without a hand touching it.
Then it reaches its destination — and the hand enters.*

Large movements are mechanised.

Small corrections become manual.

The greatest hand exposure may occur
during the smallest movement of the entire operation.

The final few hundred millimetres deserve their own assessment.

— THE PARADOX

Large Movements Are Mechanised. Small Corrections Become Manual.

A load may travel twenty metres without anyone touching it.

It may be lifted, slewed, lowered and transported entirely by mechanical means.

Then it reaches its destination.

The bolt holes don't align.

The component needs turning slightly.

The load needs moving twenty millimetres sideways.

A hand enters.

The greatest hand exposure may occur during the smallest movement of the entire operation.

This is the central paradox of final approach. Industrial operations invest heavily in mechanical handling — cranes, hoists, forklifts, manipulators, chain blocks — to keep workers at a safe distance from heavy, energised loads during transport and positioning. The engineering instinct is correct. Mechanised handling reduces hand exposure across the broad movement phase of almost every task it is applied to.

The paradox appears when the load arrives. Mechanical systems provide force and range of movement. They do not reliably provide the sensory feedback, adaptive correction and fine positional control that precise final placement requires. A crane hook does not know whether a flange is fifty millimetres out of alignment. A hoist cannot feel that the component needs rotating slightly before it will seat.

Workers know this. And so, precisely at the moment when the load is heaviest with potential energy, closest to fixed structures and surfaces, and under the greatest positional uncertainty, the hand is introduced as the instrument of final precision.

The mechanical system that safely moved the load across the facility hands control to the human hand at exactly the moment when proximity to energy is greatest.

— PSC HAND EXPOSURE CONTROL™ · DOCTRINE 02

The Last 300 mm Rule™ is not a regulatory distance or a safe-zone boundary. It is a recognition that the final approach and

— THE MECHANISM

Why Precision Demands Change the Behaviour of the Task

To understand why hand exposure concentrates in the final approach phase, it is necessary to understand what changes as a load nears its destination — and what does not change.

What changes is the precision requirement. During broad movement, a load needs to be kept away from obstructions and managed in its gross trajectory. Tolerances are measured in centimetres. A crane driver working on radio signals from a signal person can manage that level of precision reliably. As the load approaches its final position, the required precision changes by an order of magnitude. Bolt holes may need to align within five millimetres. A pump casing may need to seat on a baseplate stud pattern with no more than three millimetres of play. A flange face may need to land within two millimetres of a target surface. The mechanical system that was entirely adequate for broad movement is no longer adequate for final placement.

What does not change is the load mass. The two-tonne valve body that was safely managed by the crane during transit is still two tonnes during final approach. The suspended energy, the crush potential, the pinch geometry created by converging surfaces — none of these have diminished because the remaining movement has become small. A load twenty millimetres from its final position retains every joule of energy it carried during broad movement. Only its remaining travel has decreased.

What also does not change is the energy in the load's connections. Rigging under tension, a chain block loaded with mass, a hoist line — these carry energy throughout the final approach. If any of them shifts, slips, releases or behaves unexpectedly, the energy transfers — not to a load travelling metres away from the worker, but to a load that may be centimetres from a hand that is attempting to provide the precision the mechanical system cannot.

The result of this combination — increasing precision demand, unchanged energy, decreasing tolerance for error — is predictable. Workers move closer. Hands extend toward the load. The engineered distance that existed throughout the broad movement phase is reduced or eliminated during the phase when the consequences of contact are most severe.

The load's energy does not decrease as its remaining travel decreases. Only the margin for error does.

THE TASK STRUCTURE

The Final-Approach Transition — Where the Task Changes

A handling or installation task can be understood as a sequence of phases, each with a distinct movement character and a distinct hand-exposure profile. The phases do not always follow each other cleanly — in practice, a task may cycle between approach and final approach multiple times if the initial positioning attempt fails. But the distinction between them is analytically important, because the exposure profile of the final approach phase is substantially different from all that precedes it.

TRANSPORT	APPROACH	FINAL APPROACH	SEAT · LAND · ENGAGE
Load or component moves from its origin to the vicinity of the installation point. Broad mechanical movement. Large tolerances. Worker typically at safe distance. HAND EXPOSURE: TYPICALLY LOW	Load moves toward its installation zone. Mechanical system still in primary control. Worker closer to the load but typically managing with signals or light touch guidance. HAND EXPOSURE: VARIABLE	Load within final positioning range. Precision requirement exceeds mechanical system capability. Worker intervenes with hands for fine guidance, alignment and correction. Energy unchanged. HAND EXPOSURE: OFTEN HIGHEST	Load reaches its final position and is seated, landed, or engaged with its mating interface. Load is secured. Mechanical system may be released. Hand often still present during this transition. HAND EXPOSURE: TRANSITIONAL

The final approach phase is the point at which the task's hand-exposure profile changes most sharply. The transition from Approach to Final Approach is not always visible from a distance or obvious from a task description — it is defined by the moment when the precision demand of the task exceeds what the mechanical system can reliably provide, and manual intervention begins.

In practice, this transition is often unmarked. Lifting plans document lift points, loads, rigging and travel routes. They less frequently document the final approach phase as a distinct event — what precision is required, what happens when the mechanical system cannot achieve it, and what intervention is planned for the final positioning step.

The Last 300 mm Rule™ identifies this transition point as the moment that requires its own assessment. It does not claim that 300 mm is a universal threshold. The relevant distance varies with load geometry, task structure and mechanical system capability. What is consistent across tasks, sectors and equipment types is the phenomenon: somewhere in the final approach, mechanical control alone becomes insufficient, and a hand enters.

— THE FUNCTIONS

What the Hand Is Doing in the Final Approach

Using the eight-function taxonomy established in PSC Doctrine 01, the hand functions that most consistently appear during the final approach phase can be identified. Four functions dominate — not universally, but with sufficient consistency across sectors and task types that they represent the primary engineering targets for the final approach phase specifically.

Function 01

Guide

The hand directs the load along its final path — influencing its lateral position, trajectory, or angle of approach as it closes in on its installation point. The most common single function in final approach, across almost every sector and task type.

Function 02

Align

The hand orients the load or component to mate with its fixed interface — bolt holes to studs, flange face to flange face, shaft to bearing housing. Requires the hand to be adjacent to both the moving component and the fixed structure simultaneously.

Function 04

Stabilise

The hand arrests unwanted movement — load swing, rotation, oscillation — as the component approaches its final position. The hand is positioned between the load and any fixed structure that the load might contact if the stabilisation is not maintained.

Function 06

Position

The hand makes the final corrective placement — moving the component a few millimetres in a specific direction to achieve the required location before fixing or fastening. Often the last function performed before the load is secured, and therefore the last opportunity to reduce exposure before the task ends.

These four functions — Guide, Align, Stabilise, Position — often occur in combination during a single final approach phase. A worker may simultaneously guide a load toward its installation point, stabilise it against swing, and correct its alignment as it approaches. The combined exposure is not the sum of four separate risks; it is a single hand positioned in a zone where multiple energy types and load behaviours are present simultaneously.

The two remaining functions from the taxonomy that sometimes appear in the final approach phase are Hold — where a component must be held in position during a secondary operation such as bolting — and Retrieve, where the final approach involves reaching into a confined or restricted space to recover or engage a component. Both extend the hand's presence in the exposure zone beyond the approach itself and into the engagement or securing phase.

This function profile determines the engineering question for the final approach: what interface can Guide, Align, Stabilise and Position a load from outside the zone where the load's energy can reach the hand?

PSC HAND EXPOSURE CONTROL™ · DOCTRINE SERIES

The Last 300 mm *Rule*™

DOCTRINE 02 · FIRST EDITION · 2026

As a load or component enters its final approach, mechanical movement increasingly gives way to human precision.

The final few hundred millimetres should be treated as a distinct hand-exposure phase — observed, assessed and engineered independently of the movement that preceded it.

Small movement does not mean small energy.

Identify the final approach phase *before the task begins.*

Assess it separately. *The exposure profile is different from everything that precedes it.*

Engineer the precision. *If mechanical control loses precision before the task is complete, provide an interface — not a hand.*

— THE ENERGY

Small Movement Does Not Mean Small Energy

The most consequential misreading of the final approach phase is the assumption that because the remaining movement is small, the hazard is also small. This assumption is incorrect, and it is the source of a systematic underestimation of final-approach hand exposure across industrial operations.

The movement has become twenty millimetres. The mass is still two tonnes.

WHAT HAS CHANGED

The remaining distance to be travelled.

The load is close to its installation point. The gap between load and landing surface is measured in millimetres rather than metres. The task is almost complete.

WHAT HAS NOT CHANGED

The load mass. The suspended energy. The rigging tension. The crush potential. The pinch geometry.

None of these have diminished because the remaining travel has decreased. The energy in a two-tonne suspended load is the same whether the hook is ten metres above the landing surface or ten millimetres above it.

What also changes in the final approach phase — and this compounds the hazard rather than reducing it — is the spatial relationship between the load, the fixed structure and the hand. During broad movement, a load that swings or shifts unexpectedly typically moves away from fixed structures. During final approach, the load is converging on its fixed interface. A load that swings or shifts unexpectedly may now move toward the hand that is attempting to correct it, or toward the structure that the hand is positioned against. The geometry of risk in the final approach phase is therefore different from the geometry during broad movement, not merely in degree but in kind.

The rigging system also behaves differently under final-approach conditions. A chain block or wire rope that has carried a load through broad movement has accumulated small elastic deformations, settlements and adjustments. As the final approach proceeds and the load nears contact with its landing surface, the rigging may transfer load to the landing surface at a rate that is difficult to predict. The system is transitioning from full suspension to partial support. During this transition, the load may shift or move in directions that are not under the operator's direct control.

The hand that enters the final approach zone does so in conditions of higher energy density, higher spatial constraint, higher positional uncertainty and higher consequence for error than existed at any point during the broad movement phase. The task appears almost complete. The exposure is at its highest.

The task appears almost complete. The exposure is at its highest. These two conditions occurring simultaneously is the defining characteristic of the final approach phase.

— FIELD ILLUSTRATIONS

Four Final-Approach Scenarios

The following illustrate the final-approach phenomenon across four task types. No sector, client or specific equipment is identified. The pattern across all four is the point: mechanical control gives way to manual intervention at exactly the moment when the load's proximity to fixed structures is greatest, the positional uncertainty is highest, and the consequence of unexpected movement is most severe.

Scenario 01

SUSPENDED LOAD · STRUCTURAL LANDING

BROAD MOVEMENT

Crane moves load across facility. Worker at ground level with no contact.

FINAL APPROACH

Load within 200–400 mm of connection point. Bolt holes require alignment. Swing must be arrested. Worker's hands enter between load and fixed structure.

FUNCTIONS

GUIDE + ALIGN + STABILISE

ENGINEERING QUESTION

What interface provides guidance and alignment precision from outside the load's contact zone?

Scenario 02

COMPONENT MATING · FLANGED CONNECTION

BROAD MOVEMENT

Component lifted and positioned above mating flange. Chain block under load.

FINAL APPROACH

Component within 50–150 mm of flange. Bolt-hole pattern requires orientation. Worker reaches between converging flange faces to rotate and align.

FUNCTIONS

ALIGN + POSITION + STABILISE

ENGINEERING QUESTION

Can bolt-hole alignment be achieved through a jig, guide pin, or remote positioning interface without placing fingers between the converging faces?

Scenario 03

EQUIPMENT INSTALLATION · BASEPLATE SEATING

BROAD MOVEMENT

Equipment lifted from laydown area. Mechanical system controls descent to within 300 mm of baseplate.

FINAL APPROACH

Equipment must seat onto baseplate with stud pattern engaged. Worker guides equipment laterally and aligns stud holes with both hands inside the crush zone between equipment base and baseplate.

FUNCTIONS

GUIDE + ALIGN

ENGINEERING QUESTION

Can lateral guidance be provided by a remote push/pull interface? Can stud engagement be achieved through alignment tooling without manual finger contact?

Scenario 04

MATERIAL POSITIONING · CONFINED INSTALLATION

BROAD MOVEMENT

Material or component moved to within reach of installation point by mechanical or assisted means.

FINAL APPROACH

Installation point is partially confined. Worker reaches into restricted geometry to position component against a fixed surface. The hand is within the confined space during the final seating movement.

FUNCTIONS

POSITION + STABILISE

ENGINEERING QUESTION

Can a reaching or retrieval interface extend the worker's effective reach into the confined geometry without requiring hand entry?

— THE ASSESSMENT

Applying Find The Hand™ to the Final Approach

The Hand Exposure Audit™ (PSC Method 01) instructs assessors to observe the complete task cycle because hand exposure often occurs only at a specific moment — precisely the final approach to a landing or connection point. The Last 300 mm Rule™ deepens that instruction by identifying the final approach as a phase that merits its own assessment protocol, independent of the audit conducted for the broader task.

In practice, a task audit may correctly identify broad-movement hand exposure as low and record it as such. If the final approach phase is not separately observed and assessed, the audit record may substantially understate the total hand exposure of the task — because the phase where exposure is most significant is the phase most likely to be missed by an assessment that treats the task as a continuous whole.

APPLICATION OF FIND THE HAND™ · FINAL APPROACH SPECIFIC

At what point does the hand enter the task during the final approach phase?

What function is the hand performing — Guide, Align, Stabilise, Position, or a combination?

What energy sources are present and at what proximity during this specific phase?

What prompts the hand to enter at this moment — and at what earlier point in the task could that need have been anticipated and addressed?

That last question — at what earlier point could the need for manual intervention during final approach have been anticipated? — is the most operationally valuable question the Last 300 mm Rule™ generates. In most cases, the need for final-approach precision can be anticipated from the task structure: if a load is being positioned onto a stud pattern, bolt-hole alignment will be required. If a flange is being mated, orientation will be required. If an equipment item is being seated on a baseplate, lateral correction will be required.

The precision requirement does not arrive unexpectedly. It arrives predictably. What is frequently absent is a pre-planned engineering response to it — a jig, a guide, an alignment interface, a push/pull tool — that removes the hand from the precision task before the task begins.

The Last 300 mm Rule™ asks that this anticipation become systematic: for any task that involves a final approach to a fixed installation point, the final approach phase should be identified during task planning, assessed for hand exposure independently, and provided with an engineering response before the task is executed. Not after the hand has entered the zone. Before.

The precision requirement of the final approach is almost always predictable from the task structure. What is less consistent is the planning response to it.

— PSC HAND EXPOSURE CONTROL™ · DOCTRINE 02

— THE ENGINEERING QUESTION

If Mechanical Control Loses Precision Before the Task Is Complete — What Provides the Remaining Precision?

That question is the engineering challenge that the Last 300 mm Rule™ places on the table. It is not a question about which glove is appropriate for the task. It is not a question about supervision or procedure. It is a question about the precision interface — and whether one exists that can substitute for the human hand during the final approach phase.

The engineering response to the final approach problem follows the function profile established in the assessment. The four dominant final-approach functions — Guide, Align, Stabilise, Position — each point toward different categories of engineering solution.

Guide and Stabilise functions in the final approach most commonly call for a rigid interface that can contact or follow the load from a position that keeps the worker's hands outside the load's convergence zone. A push/pull tool, a hook interface, a dedicated handling attachment — these transfer the guidance and stabilisation function to an interface that is itself outside the hazard zone, or that at least removes the worker's hands from the immediate load-contact zone while maintaining functional engagement.

Align and Position functions in the final approach call for a different response because they require the component to reach a very precise geometric relationship with its mating interface. The engineering solutions here include alignment pins or studs that locate a component before its full weight is transferred, jigs or fixtures that constrain a component to a single axis of movement during the final approach, and guide channels or locating surfaces that allow the load to self-align as it approaches its installed position. These solutions shift the precision function from the worker's hands to the geometry of the installation interface itself.

In some tasks, the most effective engineering response is to change the sequence of the task rather than introduce a tool. If the load can be partially constrained or pre-located before its full weight is suspended, the final approach geometry changes substantially — less uncertainty, less potential for unexpected movement, less requirement for manual correction. Rigging sequence, mechanical system capability and the order in which constraints are applied all affect what the final approach demands of the worker.

ENGINEERING PRINCIPLE • FINAL APPROACH • PSC HAND EXPOSURE CONTROL™

If mechanical control loses precision before the task is complete, the answer is an engineered interface — not a human hand. The final approach phase requires its own engineering response, planned before the task begins, not improvised as the load arrives.

— WHAT CHANGES

How Organisations Apply the Last 300 mm Rule™

Adopting the Last 300 mm Rule™ as an operational principle does not require new regulation or a new safety management system. It requires that existing systems — task planning, job safety analysis, lifting plans, supervision protocols, incident investigation — ask a question they do not currently ask consistently: where is the final approach phase of this task, and what happens to the worker's hands during it?

TASK PLANNING

Identify the final approach phase before work begins.

For any task involving mechanical handling, positioning or installation, identify the point at which the mechanical system will no longer provide sufficient precision for final placement. Plan the engineering response to that phase before the task is executed — not after the load has arrived at its destination.

JOB SAFETY ANALYSIS

Assess the final approach as a separate task step.

A JSA that describes a lifting task as "lift load, move to location, land load" has not assessed the final approach. The step between "move to location" and "land load" — the final approach and positioning phase — is where hand exposure is most concentrated. It requires its own step, its own hazard identification and its own control.

LIFTING PLANS

Document what happens after the load arrives.

Lifting plans typically detail load weights, rigging configurations, travel routes and signal protocols. They less frequently document the final positioning phase — what precision is required, whether the current rigging and mechanical system can achieve it, and what interface will be used for the final approach. Include final-approach methodology in lifting plan documentation.

SUPERVISION

Observe the final 300 mm — not just the lift.

Supervisory attention during a lifting operation frequently focuses on broad movement, signal clarity and rigging condition. The final approach phase — which may last only seconds — is often the least closely supervised moment of the operation. Supervisory protocols should specifically include observation of the final approach phase and the hand positions of workers during it.

INCIDENT INVESTIGATION

Ask when mechanical control transitioned to manual intervention.

A hand-contact incident during a lifting or installation task will almost always have occurred during the final approach phase. Investigation that focuses only on the immediate contact event misses the upstream question: at what point did mechanical control give way to manual intervention, was that transition planned or improvised, and was an engineering alternative available? These questions produce findings that change the next task; the contact-only investigation does not.

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**The distance travelled may be small.
The energy is not.**

Identify the final approach before the task begins.

Assess it separately.

Engineer the precision.

WATCH THE LAST 300 MM.

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FOUNDATION	17 Years of Hand Safety Engineering
DOCTRINE 01	The Human Hand Is Not a Tool™
METHOD 01	The Hand Exposure Audit™
DOCTRINE 02	The Last 300 mm Rule™ – This Document
DOCTRINE 03	The Hand Exposure Hierarchy™