

The design principles behind warehouse systems that actually work

What experienced SAP EWM teams believe before
they configure anything





Introduction

Many warehouse systems look good on paper. They cover all processes, align with standard functionality and pass testing scenarios yet struggle once live.

The reason is rarely missing functionality. More often, it is **missing principles**.

This whitepaper explores the underlying design principles that consistently separate SAP Extended Warehouse Management (EWM) solutions that work in theory from those that work under pressure. These principles are not abstract ideals; they are practical rules that shape daily operational behaviour and guide difficult design decisions.

They explain *why* certain choices are made and *why others are deliberately avoided*.



Why design principles matter more than process diagrams

Warehouse implementations often focus heavily on:

End-to-end process flows

System capability mapping

Configuration completeness

What is less visible is the belief system guiding those decisions. Without explicit principles:

Designs drift

Inconsistencies emerge

Trade-offs are made implicitly rather than consciously

Decisions become harder to defend under pressure

“Strong warehouse solutions are coherent because they are principle-driven not because they are exhaustive”.

Adam Wilson,
Digital Supply Chain, Logistics Lead, TCT

Principle 1: The warehouse floor is the source of truth

A foundational belief behind successful designs is simple: If a process does not work on the warehouse floor, the system is wrong not the operation. This principle changes how workshops are run and how designs are challenged. It prioritises observation over assumption and reality over theory. Design implications include:

Spending time on site before finalising structure

Validating flows against physical movement

Accepting constraints such as space, distance, and congestion as design inputs

Systems that respect physical reality gain operator trust quickly.



Principle 2: The system must reduce cognitive load, not increase it

Warehouses are high-pressure environments. Operators:

Work with limited screen space

Make decisions while moving

Operate under time and volume pressure

Effective designs assume that:

The system should make decisions where possible

Operators should confirm, not calculate

Extra choices introduce risk

This principle leads to:

Simplified RF flows

Intelligent defaults

Context-driven prompts

Fewer mandatory inputs

When systems reduce thinking effort, execution improves naturally.

Principle 3: Every process must be auditable without slowing work

Traceability is non-negotiable, but it must not come at the cost of flow. Strong designs assume:

Every physical action should be linked to a user

Auditability should be implicit, not performative

Evidence should be captured as part of doing the work not after the fact

This avoids the false trade-off between compliance and productivity.

Principle 4: The system must continue to work when conditions are imperfect

Real warehouses operate with:



Partial data

Timing mismatches

Network interruptions

Last-minute changes

A core design principle is resilience: The warehouse must always have access to work, even when upstream systems misbehave. This influences choices such as:

Local task availability

Controlled decoupling from ERP timing

Graceful handling of incomplete information

Systems designed only for ideal conditions fail precisely when support is most needed.

Principle 5: EWM is the system of record for physical reality

In successful designs, SAP EWM is trusted with:

Weights and dimensions

Pack sizes

Storage behaviour

Physical stock state

This avoids fragmentation where the truth lives in spreadsheets, shadow systems, or operator memory.

When EWM owns physical reality:

Backward integration becomes simpler

Discrepancies surface earlier

Operational insight improves

This principle places responsibility in the right place close to execution.

Principle 6: Not all standard functionality should be used immediately

Experienced teams believe that: Readiness matters more than capability. Standard SAP EWM functionality is powerful, but not all of it suits every operation at every stage.



Principle-driven designs:

Sequence capability over time

Keep future options open

Avoid over-engineering at go-live

This avoids designs that look complete but overwhelm the operation.

Principle 7: Every design decision should be explainable in plain language

If a design choice cannot be explained clearly to:

A supervisor

An operator

A support analyst

Then the design is probably doing too much or hiding uncertainty.

Clear design intent:

Improves adoption

Simplifies training

Reduces support burden

Makes future changes safer

Clarity is a quality attribute, not a documentation outcome.

Principle 8: Designs must anticipate failure paths

Happy paths are easy. Effective warehouse systems are defined by how they behave when:

Inventory is wrong

Stock is misplaced

Demand spikes unexpectedly

Processes are interrupted mid-flow

Principle-led designs explicitly consider:



Where stock waits

How recovery happens

Who takes control when automation fails

Designing failure paths protects operational dignity during stressful moments.

Principle 9: Consistency matters more than elegance

Some of the most robust warehouse designs are not the most sophisticated. They are:

Predictable

Repetitive

Consistent across scenarios

This principle recognises that:

Consistency reduces training effort

Variability increases error

Elegant logic that behaves differently underload creates confusion

Warehouses value reliability over cleverness.

Principle 10: Design is a dialogue, not a hand-off

Strong designs emerge through:

Initial workshops

Structured playback

Open challenge

Explicit decision-making

Design intent is revisited, tested, and adjusted before build begins. This principle avoids:

Late surprises

Assumed agreement

“That’s not what we meant” moments

Successful EWM solutions are co-created, not handed down.



Why large programmes often lose their principles

In large implementations:

Speed can override reflection

Templates replace judgement

Decisions are distributed across teams

Accountability becomes diffuse

Principles fade when no one explicitly owns them.

Smaller, specialist teams protect principles because:

They live with the outcomes

They support what they design

They see the operational impact directly

“Principled design is easier to maintain when accountability is personal.”



Damon Conway,
Senior Solutions Architect, TCT

The payoff of principle-led design

Warehouses built on clear design principles experience:

Faster operator adoption

Fewer workarounds

Clearer support conversations

Lower long-term maintenance burden

Greater confidence under pressure

The system behaves in line with expectations even when conditions are difficult.



Conclusion: Principles are what remain when diagrams fade

Process diagrams change. Volume profiles shift. Structures evolve. What endures are the principles that guided the design. Warehouse systems that actually work do so because they were shaped by:

Respect for physical reality

Empathy for operators

Willingness to exercise restraint

Courage to make decisions explicit

When principles are clear, design decisions follow naturally.



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