

# From Polka-Dotted Gloves to Engineered Impact Protection

*How India's industrial hand protection evolved from basic coverage to task-specific safety engineering.*

**W**alk into almost any fabrication shop, rig stores department, or factory gate in India built before the last decade, and the picture in the storeroom is almost always the same: cardboard boxes stacked along a wall, each one holding dozens of pairs of knitted cotton gloves, palms dipped in red or blue PVC dots, issued by the dozen to whoever asked. For a very large part of India's industrial workforce, that glove *was* hand protection. It was inexpensive, instantly available from any hardware market, simple to size, and familiar enough that nobody needed to be trained to use it. A new worker on his first day on a rig floor or a fabrication line would be handed a pair without a second thought, because that was what a "safety glove" meant.

That glove did a real job. It improved grip on dry tools and components. It reduced the kind of minor abrasion that comes from handling rough material all day. It kept hands marginally cleaner around grease and dust. And because it cost so little, nobody hesitated to replace it the moment it wore through — which, given the materials, tended to happen often.

What it never did, because it was never built to, was answer a much harder question: what happens to the hand when the hazard does not come from the surface the palm is gripping, but from above, from the side, or from between two moving pieces of steel?

That question is the subject of this piece. It is the story of how Indian industry's idea of a "safety glove" gradually had to change — not because the dotted glove failed at its job, but because industry kept asking it to do a job it was never designed for.

## The Glove India Knew

For a long stretch of India's industrial growth, the polka-dotted glove was simply what a glove was. Its appeal was never complicated. It cost a fraction of anything else on the market, it was stocked in every hardware shop and safety supply counter from Vizag to Vadodara, it came in sizes simple enough that a storekeeper could hand out the right pair without measuring anyone's hand, and it was familiar — workers had grown up seeing seniors and colleagues wear the same glove, so there was nothing to explain and nothing to resist. On dry surfaces, the PVC dots genuinely improved grip. The knitted shell did reduce the kind of light abrasion that comes from handling rough timber, sacks, drums, or general components through a long shift.

None of this made it a poor product. It did precisely what a low-cost, general-purpose work glove is supposed to do. The difficulty was never in what the glove delivered — it was in what industry quietly began asking it to deliver as work got heavier, faster, and more mechanised.

A glove designed to improve grip while handling cardboard, dry tools, or light components was, at some point, being issued to a worker rigging a sling, breaking out drill pipe, or guiding a load past moving steel. The injuries that mattered most in those settings were rarely about grip at all. They were about impact — a hand caught between a swinging load and a fixed structure, a knuckle struck by a slipping wrench, a finger pinched as two sections of pipe came together. None of that had ever been part of the dotted glove's design brief. The issue, in other words, was not that the glove failed at its job. The issue was that the job had changed underneath it.

## When One Glove Was Expected to Do Everything

Part of why this gap persisted for so long was procurement habit rather than oversight. Many Indian industrial sites — across material handling, maintenance, fabrication, rigging, loading and unloading, pipe handling, and warehouse operations — issued a single general-purpose glove model across almost every task on the floor. It was simpler to stock one SKU than ten. It was easier to train a new worker on one glove than to explain why a different pair was required for the next job. And because the dotted glove was "good enough" for the majority of light tasks, it became the default for all of them, including the minority of tasks where the actual hazard had nothing to do with grip or light abrasion.

The weakness in this approach becomes obvious once stated plainly: different tasks expose different parts of the hand to different mechanisms of injury, and a single glove cannot be optimised for all of them at once. A glove suited to handling cardboard or dry components is not necessarily suited to tubular handling, wire rope, sharp steel edges, heavy striking tools, wet deck surfaces, drilling mud, pinch points around moving machinery, or surfaces abrasive enough to wear through a knit shell within days.

*A glove should be selected by exposure, not by habit.*

## The Injury Mechanisms Traditional Gloves Could Not Address

Industrial hand injuries are not a single category of risk. They include:

- Abrasion, cut, and puncture
- Impact, crush, and pinch
- Thermal and chemical exposure
- Vibration and entanglement

Each of these mechanisms calls for a different engineered response. A glove built to resist abrasion does not automatically resist puncture. A glove that resists cuts on the palm does nothing for an impact to the back of the hand. This is not a flaw in any particular product; it is simply how protective equipment works. Coverage and material have to be matched to the hazard, zone by zone.

The zone that traditional gloves consistently left exposed was the back of the hand — the knuckles, the fingers, the fingertips, the metacarpal bones across the back of the palm, the thumb saddle, and the sidewalls of the fingers. A knitted shell with a PVC-dotted palm offers no engineered structure on the dorsal side of the hand at all. There is nothing there to absorb or redirect the energy of a strike. In tasks where the dominant hazard is a struck-by or caught-between event — a slipping tool, a swinging chain, a hand caught at the edge of two closing surfaces — the part of the hand most exposed is exactly the part the glove was never built to protect.

None of this means an impact glove makes such an event safe. No glove, however well engineered, can turn a severe crush or entrapment incident into a non-event. What changes is the severity of what happens when contact does occur — and only within the zones the glove is actually designed to cover.

## Oil and Gas Changed the Question

Few environments expose this gap more clearly than oilfield and drilling operations. Work on a rig floor or offshore deck routinely involves drill pipe, tubulars, tongs, slips, shackles, slings, and chains, alongside heavy hand tools, much of it in motion, much of it under load, and almost all of it in direct proximity to a worker's hands. The same shift might also involve general material handling and maintenance work, layered with wet, oily, or muddy surfaces that make grip itself a safety issue, not just a convenience.

In that setting, palm grip alone was never going to be sufficient. Workers needed protection against several hazards arriving at once — impact, cut, abrasion, and puncture risk, combined with wet or oil-contaminated surfaces, reduced dexterity from repeated heavy handling, and long shifts where a glove had to perform consistently for hours rather than minutes. It was this combination of exposures — not any single hazard in isolation — that created the need for a genuinely purpose-designed impact glove, rather than a general-purpose one asked to stretch beyond its design.

## The Arrival of Engineered Impact Protection

What changed with the arrival of gloves built specifically for this purpose was not just the addition of padding. It was a shift in how the glove itself was conceived. Rather than fabric with a gripping surface, the glove became an engineered system: back-of-hand impact elements positioned by zone, segmented thermoplastic rubber that allows the fingers to articulate rather than stiffen into a fist, palm construction chosen for the specific surfaces it would meet, reinforcement at the thumb saddle and other high-wear points, cuff design suited to quick entry and removal, and material selection that varied by intended use.

None of this is straightforward to get right. Every additional millimetre of impact-absorbing material is a trade-off against dexterity, weight, heat retention, and how long a worker is willing to keep the glove on before fatigue or discomfort wins out. A glove that protects well but gets removed within an hour protects nobody. The geometry of where protection sits, how it flexes, and how much coverage it actually needs — rather than simply the presence of more rubber — is what determines whether an impact glove performs as intended.

*More material does not automatically mean more protection; effective protection depends on coverage, geometry, flexibility, and fit to the specific task.*

## When Impact Protection Came to India

This category of glove existed for some time before it had any real presence in the Indian market. When PSC introduced KONG® impact gloves to India in 2008, it was entering a market where this kind of dorsal hand protection was largely unfamiliar. There was little established awareness of back-of-hand injury risk specifically, no existing impact-glove category for buyers to compare against, and a procurement culture still strongly anchored to price per pair. General-purpose gloves remained the default, and there was real scepticism — not unreasonable, given the price difference — toward a heavier, more expensive glove that workers had never asked for and safety teams had no existing framework to evaluate.

PSC's role in that period was less about supply and more about building a category from nothing. That meant visiting industrial sites directly, demonstrating the gloves in hand rather than describing them in a catalogue, sitting with safety and operations teams to walk through what a caught-between or struck-by incident actually looks like on the back of a hand, and placing a conventional glove next to a purpose-designed one so the difference was visible rather than theoretical. There was no established impact-glove market in India; awareness had to be built before any demand could exist. PSC was not the first company anywhere in the world to introduce this category — that distinction belongs to Ironclad's original development work with the international oil and gas safety community — but PSC was among the earliest to bring it into India, and to do the patient, unglamorous work of building acceptance for it, one site visit at a time.

## Why Price Per Pair Delayed the Transition

The biggest structural obstacle to that acceptance was not technical. It was how procurement decisions were made. For most buyers, a glove was compared the same way any consumable was compared: by its price per pair. On that measure alone, a general-purpose glove will almost always look like the better deal, because the comparison stops before it reaches the question that actually matters.

A more complete way to compare gloves is by **cost per working day** — purchase price divided by the number of verified usable working days the glove delivers under real conditions. A glove that costs several times more per pair can still represent better economic value if it lasts substantially longer, resists abrasion better, is more likely to be accepted and actually worn by the worker it was issued to, and needs replacing far less often.

None of this means an expensive glove is automatically the right choice; the correct glove is simply the one that provides suitable protection and usable working life for the task it is actually being used for. What the price-per-pair habit obscured, for a long time, were the hidden costs sitting on the other side of the ledger: premature wear, frequent reissue, poor grip leading to dropped tools or components, outright worker rejection of an uncomfortable glove, incorrect sizing, lost dexterity, and — underneath all of it — an exposure that was never actually addressed by the glove that looked cheapest on the purchase order.

## From General Purpose to Task Specific

The more mature version of glove selection that has gradually taken hold does not start with a brand or a model number. It starts with the task. A useful way to frame that question is as a short series of checks:

- 1 What is being handled?
- 2 Where on the hand can it strike?
- 3 Is there cut exposure?
- 4 Is the surface abrasive?
- 5 Is puncture a realistic risk?
- 6 Is the surface dry, wet, oily, greasy, or muddy?
- 7 How much dexterity does the task demand?
- 8 Is heat or cold a factor?
- 9 How long is the glove worn continuously?
- 10 Can the hand be removed from the hazard altogether?

Run any real industrial task through that list and it becomes clear why one glove was never going to suit every job. A worker handling routine tools and components across a general industrial site, where the dominant risk is impact rather than aggressive cutting, is working under a different exposure profile from a deck crew handling wire rope, scrap steel, and wet surfaces in a high-abrasion environment.

Within the same KONG® range, this is the difference between a model like the **SDX2** — built around a double-layer synthetic leather palm and full-coverage impact protection at the fingers, thumb, knuckles, and metacarpal, carrying an ANSI Cut Level A2 and an EN388 4242AP classification — and a model like the **KDC5** — built with a four-layer Armortex® palm and cut-resistant liner for serious abrasion and cut exposure, carrying an ANSI Cut Level A7 and an EN388 4X44FP classification, with a DuPont™ Teflon™-treated shell for wet and oily conditions. Both gloves share the same impact-protection logic at the back of the hand. They diverge specifically where the task diverges — in how much the palm itself needs to resist a blade edge or an abrasive surface. That divergence is the entire point of task-specific selection: not "which glove is better," but "which exposure profile does this task actually present."

## The Worker Decides Whether Protection Works

A glove with the right certification on paper provides no protection at all if the person wearing it takes it off, or never puts it on in the first place. Fit, heat, sweating inside the shell, bulk around the knuckles, stiffness across the fingers, palm bunching, and the loss of tactile feedback needed to retrieve a small bolt or feel a tool's grip are not minor comfort complaints — they are the reasons a glove ends up sitting in a back pocket rather than on a hand during the exact moment it was needed.

A useful trial records more than whether the worker liked the glove. It tracks the issue date, the number of working days completed, the task actually performed, where wear first appeared, grip and dexterity during the actual job, the condition of seams and impact elements over time, and — most usefully of all — the actual reason the glove was eventually withdrawn from use.

## A Glove Can Protect the Hand. It Cannot Correct Unsafe Hand Placement.

It is worth being direct about what even a well-engineered impact glove cannot do. It remains personal protective equipment — the last layer in a chain of controls, not a substitute for the layers ahead of it. A glove may reduce the severity of an injury during accidental contact within the zones it is designed to cover. It cannot prevent a hand from being crushed between two heavy objects, make direct handling of a suspended load acceptable, replace machine guarding or isolation procedures, prevent entanglement in moving equipment, or correct a task that was poorly designed in the first place.

*Protect the hand where residual exposure genuinely remains, and engineer the hand out of the hazard wherever that is possible instead.*

An impact glove and a no-touch handling tool are not competing solutions — they serve two different, complementary purposes. One reduces the consequence of contact that cannot be entirely eliminated. The other changes whether the hand needs to be in that position at all.

## **What the Transition Really Represents**

Seen from a distance, the shift away from the dotted glove was never really about one product replacing another. It was a change in how the question itself was asked — from lowest price toward cost per working day, from one glove for every task toward exposure-based selection, from palm-only thinking toward engineered protection across the whole hand. That transition is still far from complete. A great many Indian industrial sites continue to issue general-purpose gloves for tasks that carry serious impact, cut, or crush exposure, often because nobody has yet asked the question this piece opened with.

**T**he polka-dotted glove deserves to be remembered accurately rather than dismissed. For a long period of India's industrial growth, it protected a very large number of hands from the everyday wear of general work — dirt, light abrasion, the basic business of holding and handling things for a full shift. It represented a particular era's answer to a simple question: how do we cover the hand? That answer was not wrong for the work it was built for. It became insufficient only as the work itself changed — as equipment grew larger, hazards became better understood, and the standards used to measure protection grew more sophisticated than whether a worker had something on his hands at all.

*The polka-dotted glove represented an era when covering the hand was considered protection. Engineered impact gloves represent a more mature question: what exactly can happen to the hand during this task, and how should that exposure be controlled?*

**The future of industrial hand safety will not be built around one glove for every worker. It will be built around the right control for every exposure.**