

# The Importance of Mobile Computer Durability and Ergonomics—Why Rugged Devices Cost Less

## Executive Summary

- Lured by lower initial prices, mobile computer buyers sometimes choose commercial devices over more-rugged industrial devices.
- In challenging environments, commercial devices require more repairs and don't last as long.
- Less-durable devices often lack the capability of industrial models—requiring add-on peripherals that increase the risk of damage in use.
- Research demonstrates that commercial devices don't hold up well in warehouse and transportation use—and cost considerably more than industrial devices in the long run.



Those responsible for purchasing mobile computers naturally seek to minimize costs. There's a temptation to choose PDA-type or commercial-grade devices over true-industrial devices because their initial price may be lower. However, choosing these light-duty, less-durable mobile devices means adding significant support, early replacement and downtime costs—expenses that quickly overwhelm any initial savings. In addition, it can mean unacceptable risk when you're running mission-critical applications. Considering all costs of ownership over the lifetime of mobile computers, true-industrial devices cost less—and provide a far greater return on investment (ROI).

## The Differences Between Light-Duty and Ergonomically-Designed True-Industrial Devices.

Being mobile isn't easy on employees. And it's even tougher on their mobile computers. When used by mobile employees, devices are in constant, heavy operation. They're often dropped and knocked, subjected to vibration, and exposed to dust and rain—conditions that will quickly reveal any vulnerability. If dropping a mobile device on a hard floor causes sudden failure in a mission-critical health-care application, the consequences can be disastrous. Moreover, light-duty devices aren't likely to stand up to hard use in the environmental conditions of warehouse, delivery truck and outdoor use for long. That's because these devices aren't designed for continuous duty—or to provide high levels of wear, water, dust and shock resistance.

Ensuring true industrial durability in mobile computers demands that every component be designed and selected for exceptional durability. For example, parts that work well in PDA use (such as glass touchscreens) have to be ruled out in favor of stronger alternatives (like shatter-proof polycarbonate). Moreover, because industrial devices are typically in constant use, it's essential to ensure that ruggedizing doesn't compromise ergonomics.

Often, commercial devices don't offer all the functionality mobile users demand of their computers. While broad capabilities are built into industrial mobile computers (with more offered as factory options), they often must be added to less-capable devices via plug-in peripherals. This increases both expense and vulnerability, and it compromises ergonomics, making device damage more likely. Combining a mobile computer with peripherals often means multiple vendor sources, adding complexity and cost in purchasing, warranty service and support.

## Ruggedized Mobile Computers Deliver Documented Savings.

Real-world experience proves that purchasing industrial-grade mobile computers instead of less-durable devices delivers a significantly lower total cost of ownership (TCO). This is documented in an important study by Venture Development Corp. (VDC),\* an independent technology market research and consulting firm. It found that ruggedized devices needed fewer repairs and lasted far longer when compared to commercial-grade devices. The study did not consider PDAs—the least durable type of mobile devices. If it had, the TCO advantage of industrial mobile computers would have been even more striking.

In surveying mobile device users, VDC learned that over the previous 12 months, those using commercial mobile devices experienced failure rates that were almost double those of industrial device users. Well over a third (35 percent) of commercial devices had been replaced after only two years, compared to only 2 percent of ruggedized devices. After three years, 80 percent of commercial devices had been replaced.

## More Frequent Replacement Adds Cost.

VDC found that the typical replacement cycle for mobile devices in mail/courier/freight respondents was 5 years for ruggedized devices vs. 3 years for commercial-grade devices, with annual costs for the industrial-grade devices being more than 47 percent lower. In warehouse/distribution center use, industrial devices were replaced after 4.5 years vs. 3 years for commercial devices. The industrial devices cost almost 21 percent less per year.

When repairs were required, the commercial devices were typically out of commission considerably longer than the industrial devices. Downtime typically costs users of commercial devices about four to five times more than the purchase price over the life of the device.

Shorter warranties may also contribute to the higher ownership costs of commercial devices. Despite their longer life span, 82.3 percent of the industrial devices in VDC's study were under warranty, while only 66.3 percent of commercial devices were still covered.

## Industrial Device Savings are Substantial.

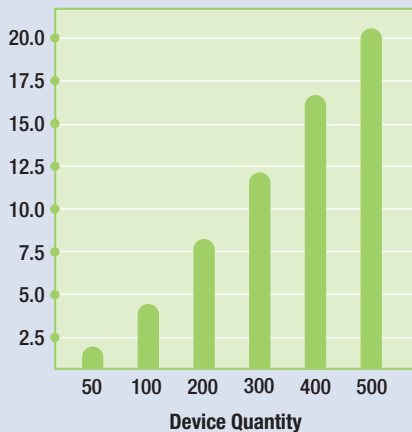
VDC's study concludes that over a period of five years, companies using industrial-type mobile computers in the field typically saved 17 percent in TCO compared to companies using commercial units. In supply-chain applications, the savings were even greater at 32 percent.

Those surveyed were asked to evaluate various device features and specifications on a scale ranging from "not critical" to "most critical." "Reliability/minimal downtime" and "ruggedness/durability" received the highest "most critical" ratings. Only "ease of use—hardware" was considered as critical.

\* Total Cost of Ownership Models for Mobile Computing and Communication Platforms, Venture Development Corp., 2003

### Five-Year TCO Savings—True-Industrial vs. Commercial-Grade Mobile Devices

\$ Amount Saved  
Hundreds of Thousands



**Notes:** Average savings per device is \$4,062 over a five-year life span.

TCO costs include:

- Initial deployment and maintenance costs (device, peripherals, software, implementation, training and maintenance)
- Downtime and productivity (the cost of lost hours for operators plus IT support costs)

Downtime and productivity savings are broken out separately in the chart on the opposite page.

The purchase choices of experienced supply-chain mobile device buyers in the survey clearly reflect those ratings: 62.3 percent of mobile device users surveyed chose true-industrial devices. Only 15.6 percent chose commercial, while 22.1 percent chose a mix of rugged and commercial. Note that the latter choice requires supporting two platforms, adding integration and support cost.

### Industrial Mobile Devices Provide Superior Productivity.

In comparing ownership costs of industrial mobile computers and commercial-grade devices, VDC studied the human costs—operation/staff time and downtime/productivity loss. Annual downtime for commercial-grade products was almost twice that of industrial-grade devices. Commercial-grade mobile computers had nearly twice as many hours of lost productivity and their units required almost double the hours of IT support. The result was an added cost for commercial-grade devices of more than \$692 per year vs. industrial devices. Assuming a five-year product life, commercial-grade products cost more than \$3,460 in lost productivity.

### Durability Has to be Proven.

Even the most durable components can't ensure that a mobile computer is rugged enough to stand up in the real world. Extensive testing is necessary to prove that a design has what it takes. Mobile computer manufacturers looking to achieve industrial-grade durability must establish standards for impact resistance, and tolerance for vibration and temperature—then test to ensure the standards are met. While these tests often are performed by the manufacturers themselves, testing to IEC IP standards for dust and water resistance must be performed and certified by independent testing laboratories.

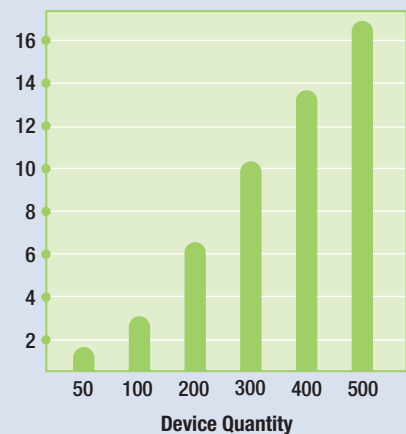
Industrial mobile computers are typically rated IP 64, with the 6 indicating that the device is dust-tight and the 4 indicating that the device is protected against spraying or splashing water. Because these devices can be ordered with integrated capabilities real world use demands, there are fewer concerns about the durability of peripherals—which may not have been tested to IP standards.

### The Right Choice for the Fastest ROI.

Mobile computers that have proven to meet high standards for durability under harsh conditions while providing operators with superior ergonomics offer extensive benefits to mobile employees and management alike. They're less likely to need repairs or premature replacement. They deliver more uptime, helping mobile employees to be less frustrated and more productive. They typically last much longer, deferring replacement expense. And best of all, they cost significantly less and yield a far faster ROI than less-durable devices in the long run.

**Five-Year Downtime and Productivity Savings—True-Industrial vs. Commercial-Grade Mobile Devices**

**\$ Amount Saved in Hundreds of Thousands**



**Note:** Average savings per industrial device is \$3,460 over a five-year life span.

Downtime and productivity savings comprise most of the TCO advantage of industrial mobile computers.

## Dolphin® Mobile Computers Offer Proven Industrial Durability, Ergonomics—and Value.

Examine a Dolphin Mobile Computer by Hand Held Products, and you'll see a trim, lightweight device that's remarkably comfortable to handle—with no user penalty resulting from its true-industrial construction. Because these devices are solid-state designs—including everything from memory to on-board radio modules to the uniquely versatile Adaptus™ Imaging Technology 5.0—there are no internal moving parts to wear.

Dolphin touchscreens appear much like other top-quality portable displays. But they're constructed with a shatter-resistant, nearly indestructible polycarbonate—then protected with an extra-hard wear layer to enable them to stand up to years of signature capture. You might not see the difference in the computer's docking connector either. But it's built to military specifications and can withstand up to 100,000 mating cycles while providing shock and vibration immunity. In addition, Dolphin Mobile Computers feature high-duty-cycle keyboards, tested to over 1 million actuations.

Look inside a Dolphin's rugged casing, and you'll find industrial-grade electronic components mounted to a cast magnesium frame. This frame adds remarkable structural strength and support for all electronic components. What it doesn't add is weight. This exceptional durability extends to Dolphin battery packs, ultrasonically welded to withstand vibration and impacts—and to our Teflon®-coated bases and rugged accessories, too.

### Tested Tough.

Every Dolphin Mobile Computer and battery pack design has been subjected to Hand Held Products' accelerated life tests (ALT)—multiple sequences of varied drops and vibration at room temperature, low temperature, high temperature and again at room temperature. Outside labs perform additional testing and certification on all Dolphin models per IEC requirements to IP 64 standards. The 6 represents the highest resistance to dust penetration (dust-tight). The 4 indicates that the device is protected against spraying and splashing water.

With their extra-rugged construction, proven durability, two-year limited warranty and affordable prices, Dolphin Mobile Computers offer mobile employees a dependable, worry-free productivity tool. For management and support, they provide exceptional ROI, low TCO and remarkable value.



	Dolphin Mobile Computers	Commercial Mobile Devices
Water resistant	<b>Yes</b>	No
Dust-tight	<b>Yes</b>	No
Rugged touchscreen	<b>Yes</b>	No
Military spec connector	<b>Yes</b>	No
Magnesium frame	<b>Yes</b>	No
Integrated imaging	<b>Yes</b>	No
High impact resistance	<b>Yes</b>	No
Longest useful life	<b>Yes</b>	No
Lowest TCO	<b>Yes</b>	No



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