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Understanding the Source of Product Damage

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Today's Supply Chain Environment

In the age of big data, companies are accumulating mountains of it. Data is gathered by every department in an organization on a countless number of parameters. The supply chain function is not different.

How are we performing?
How many units have we sold?
Where are my goods in the supply chain right now?
How many units are lost in the supply chain?
How much am I spending on packaging?
Is my packaging adequate?
How many goods are damaged in the supply chain?
Could I reduce my packaging costs somehow?

The number of questions that we ask ourselves daily is growing constantly. One more question we should ask ourselves is, "What are we doing differently now that we have all this data?" Today more than ever, it is important to take this mountain of data and turn it into information. Today, how and when you deliver a product is a strategic advantage and part of that product's added value.Actionable information helps you capitalize that by developing a plan to address challenges in your supply chain.

Every day an amazing number of shipments are made around the globe. Amazon alone shipped more than 5 billion parcels to Prime members in 2017. Globally, the number of active shipping containers is estimated at 29 million, and there are approximately four times as many ships at sea today than in the early 1990s. There is a constant rush to get products from where they are to where they need to be. Even when everything appears to be the same in the supply chain – same carrier, same shipping lane, same packaging – every day is different. Any number of variables can come into play for any particular shipment. These variables add to our list of questions, making them more difficult to quantify.

Were the people handling my product aware that it's fragile? Were they trained properly to treat my product with care? Were the conditions on the dock, during transit, or in the warehouse all the same? Was anyone in more of a hurry than normal, causing my shipment to be mishandled? What really is happening to my product once it's packaged and sent on its way?

If everything were perfect from the manufacturing site to the end customer, damage would never be a concern in the supply chain. However, everyone knows that damaged shipments are a very real part of normal business operations. Sometimes it is clear what happened to a shipment but, more often than not, there are questions regarding who is accountable for the damage. Did it happen on the manufacturer's loading dock? Was the shipment not secured properly in the transport vehicle? Did it happen when the product was moved from one transport mode

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to another (truck to rail, truck to air, etc.)? Did it happen when the shipment was unloaded? Or, did it happen after the product was safely delivered because the end customer mishandled the product? The truth is that damage happens somewhere, and it's often difficult to know exactly where.

Mechanical damage to goods accounts for approximately 43% of insurance claims made by shippers. Environmental damage (including damage from water and humidity) account for another 15% of claims.[1]

As recently as 2013, perishable cargo accounted for 90% of the world's maritime reefer transport capacity. There, loading cargo before it's properly chilled is one of the leading causes of cargo claims, according to marine insurer, the TT Club.

Other products are subjected to rough handling or other unacceptable conditions during transport – in 2015, 37,000 migrants attempted to enter the UK through the Channel Tunnel, breaking cargo seals on trucks often left unidentified upon receipt of a shipment, so the responsibility of product failure falls back to the manufacturer, even if the damage occurred in transit. The result is harm to your reputation as a manufacturer, not to mention added expenses in repairing the damage or completely replacing the product. In recent years, the cost of goods damaged in transit has been more than US $4 billion annually.1 Is accountability for these damage costs being assigned to the correct party?

What if you knew that something unexpected happened on the trip? During transportation, incorrect handling, securement, and/or packaging of goods cause 60% of losses.[2] Knowing that mishandling occurred during transit allows the recipient to inspect for damage immediately and helps assign accountability for issues. Discovering that the packaging was insufficient to protect your product allows you to make enhancements. Discovering that you are over-packaging a product allows you to make cost-saving adjustments. The point is that you have information and that information can be used to help minimize risks in the future.

Environmental Monitoring Helps Manage Risks

As Lloyds' Market Insight Report 2017: Cargo (re insurrance, notes: "Bringing together statistical forecasting methods, big data techniques, telemetry solutions, and high resolution satellite imaging, could provide underwriters with a more realistic view of in-transit cargo exposure." That's true for logistics and supply chain professionals, too. "Accurate monitoring of static in-the-course-of transit and in-transit cargo risk constitutes good practice," the Lloyds report goes on to say. Environmental recorders can supply much of the data that's needed to reduce damage on existing shipments and to lay the groundwork for insights into the entire supply chain. By recording and notifying shippers of excursions from the normal parameters for shock, vibration, humidity, tilt, and temperature, shippers can:

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- Identify typical shipping conditions
- Improve processes and packaging
- Understand product tolerances
- Evaluate shipping lanes, carriers, and handlers

Today, some data recorders have GPS capabilities that allow you to determine exactly where mishandling occurred. Whether simply recording the GPS coordinates and reviewing them after the trip or using a real-time system to communicate issues during transit, solutions are available to help you make more informed decisions.

The business applications have increased as the technological capabilities of monitors and loggers have advanced. For example: initially, data recorders were used simply to settle disputes and to support accept/reject decisions. Today, the information is integral to product quality and process improvement.

Analysis and Reporting

Generating the data is one part of the solution. Analyzing it is the other. This combination is where the business value of data recorders becomes evident. One of the most significant benefits of recorders is their ability to generate reports. Rather than manually analyzing massive data sets in a spreadsheet or comparing chart recorder printouts, reports that illustrate conditions in your supply chain can be generated automatically upon receipt and at any point along in transit. These report enable managers to look beyond individual incidents to identify trends throughout their supply chain. With this information, they can concentrate on resolving the most critical issues throughout their supply chain rather than sorting through mountains of data.

Support Smart Decision Making

Data from environmental monitors can be used to model product degradation, determine why damage occurred, and adjust procedures or retrain staff to minimize future incidents. A complete journey profile allows you to evaluate what happened during transit and storage so you know what you might encounter in the future.

For example, consider the transportation of heavy equipment such as energy drilling tools and power transformers. This equipment is expensive, uniquely transported, and often requires extensive testing before it leaves the manufacturer and again once it arrives on site for installation. The installation cost can range from thousands to hundreds of thousands of dollars, so ensuring the equipment is in working order before installation is essential. A data recorder allows the receiver to determine whether unexpected impacts have occurred on the journey and whether those impacts were within acceptable limits. That insight helps determine the level of inspection the equipment needs.

The transport of perishable goods is another example.. Temperature controlled shipping is required for products like meats and seafood, and is advised for fresh produce. Adding temperature monitors to the core and the exterior layers of product shows, incontrovertibly, whether the cold chain was maintained. If temperature excursions occurred, knowing their extent and duration allows receivers to make informed decisions regarding shelf life or even product safety.

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No one wants to eat oysters if the temperature was not maintained and bacteria were able to grow, but apples that warmed may merely have a shorter shelf life.

Risk Assessment Leads to Reduced Costs

Testing product packaging in a lab environment does not always accurately model handling in real-world environments. While it is impossible to have complete visibility and control at all times, transporting products introduces additional risks. At a practical level, managing this risk comes down to having the right tools in place. Data recorders provide a set of eyes on your products even when you cannot be present physically. Recorders provide the ability to accrue data for shipments, correlate incidents to damage, identify damage boundary conditions, and produce a trend-based risk assessment for particular routes, carriers, and packaging methods. The results of such analyses can trigger changes in package design, choice of shipping lanes, and modes of transportation to reduce in-transit damage. Through analysis, data is available to help managers make risk-based decisions, protecting their products and their customers. Improved information leads to improved processes, a reduction in the number of incidents, reduced repair/replacement costs, improved customer satisfaction and, ultimately, an improved bottom line.

In a simulation performed by Ilic et al., the use of monitors to observe the temperatures of perishable goods throughout their transport decreased the amount of unsellable goods by 36% and in-store waste by 50%, which ultimately increased profit by 8.5%.[3]

Scalability

High-value shipments or high-risk shipping lanes can justify the use of a data recorder on every Shipment. These shipments can be extremely expensive to replace both in terms of time and money. In the example of the multi-million dollar power transformer, a replacement transformer is not likely to be waiting on the shelves if the original unit is damaged. Instead, if the original shipment is damaged in transit, a is secondary analysis must be performed, insurance claims must be filed, and delays absorbed. Having accurate, objective data is critical to recovering damage-related costs. However, a data recorder on every shipment may not be the answer for every situation.

For many environments, the ideal path forward is to use a data recorder to gather data for a period of time, analyze the information from the shipping lanes, and determine what a typical shipping lane looks like for your product. With this information, you can determine the typical temperatures as well as the force and number of impacts your product encounters on a typical day, as well as the extremes. If you determine that your product and packaging are sufficient to survive a typical day without incident, it is possible to monitor for worst case conditions with simple impact or temperature indicators.

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Accountability

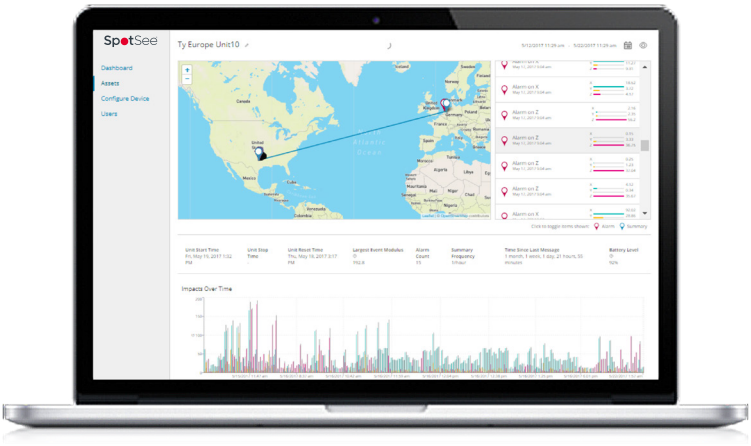
Human behavior is the greatest contributing factor in the prevention of damage during transportation.[2] When evaluating the use of either a data recorder or an indicator, don't underestimate the value of using monitoring devices as deterrence. Just knowing that a shipment is being monitored changes cargo handlers' behaviors.

Think of it as a policeman on the side of the highway. With a radar system, he is monitoring the speed of passing cars, but his mere presence results in drivers checking their speed and reducing it if that's the necessary action to minimize the chance of a citation. The same principal holds true for recorders or indicators. When people know the shipment they are handling is being monitored, their natural reaction is to take better care of the shipment. No one wants to be blamed for product damage.

Utilizing environmental data recorders in your supply chain improves your understanding of the conditions your shipments are experiencing after they leave your sight. The information gathered allows you to make adjustments to your packaging, your transportation routes, and your carriers.

For nearly fifty years, Spotsee has provided solutions to help customers monitor their supply chains. By tracking and analyzing the environmental data provided by Spotsee monitors, customers report that damage is typically reduced between 30% and 70% during the first six months of use*.

Regardless of the type of technology used today or in the future, data logger manufacturers will have to tackle issues related to ever-changing compliance regulations, technology innovation and, above all, flexibility to meet customer needs. When selecting a data logger, focus on product scalability, future needs, and evolving compliance standards. These factors all will help you feel confident in your decision.



*Damage percentages and cost reductions are based on actual data from customers; however, results may differ from customer to customer based on testing, program implementation and product selection. ShockWatch does not guarantee any of the above results. References and case studies are available upon request. Contact your local Spotsee representative (info@spotsee.com) for more information.

Sources:

1. David, Pierre A., and Richard D. Stewart. International Logistics The Management of International Trade Operations. Cengage Learning, 2010.
2. Zurich Cargo Risk Academy. "Thinking outside the Box" (2011).
3. Ilic, Alexander, Thorsten Staake, and Elgar Fleisch. "Simulation Study on the Effect of Sensor Information in Supply Chains of Perishable Goods." (2009).

SpotSee® Impact Indicator Technical Data

ShockLog® Cellular

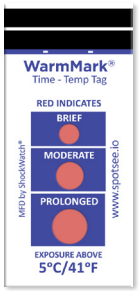
ShockLog Cellular shock recorder, adding cellular connectivity to the ShockLog 298 impact recorder, sends you a text or email whenever an impact exceeds your pre-set thresholds, anywhere there is cell service. The ShockLog Cellular combines the powerful monitoring capabilities of the ShockLog 298 impact recorder with a cellular communication module to deliver real-time notifications of unacceptable handling in the supply chain.

ShockLog® 298

ShockLog 298 monitors and records shock, vibration, and environmental conditions experienced by any type of structure or equipment, whether in use, in transit, or in storage. With the capacity to record data for 870 events and 262,000-time slots, the device alerts you whenever damage may have occurred so you can respond promptly. Optional sensors extend the value of your ShockLog by providing more intelligence about your environmental journey by adding temperature/humidity sensor into unit, or adding a temperature/pressure/humidity accessory sensor.

ShockWatch® 2

ShockWatch 2 impact indicators are single-use, go/no-go devices that determine if fragile products have been dropped during transit or in storage. The indicators are field-armable, tamperproof devices that turn bright red when an impact beyond a specific threshold has occurred. Each ShockWatch 2 has a unique identifier to support traceability.



WarmMark®

WarmMark, a time-temperature indicator sticker, provides insights into your cold chain logistics so you will know which packages may have experienced thermal damage and which were handled properly. This single-use temperature recorder for shipping turns red when it reaches the temperature threshold you selected. Then, unlike many temperature indicator stickers, WarmMark starts a countdown, with its three individual indicator dots changing color for brief, moderate, and prolonged exposure.

Contact Spotsee about your supply chain and explore our best-in-class logistics devices.
www.spotsee.io/contact