

1. Introduction

LoadProof (<https://loadproof.com/features>) is a Centralized Cloud based Enterprise Photo Documentation System for Supply Chain. It is built on the premise that photos and videos are vital documentation serving as compelling proof of important operations performed in the supply chain within and across organizations. These operations may be related to fulfilling customer orders, meeting contractual obligations, or while transferring merchandise across different parties partaking in the Supply Chain functions and operations.

Photo and video data are too important to be left stored in someone's smartphone, inbox or computer. They should be carefully collected and saved in a professional centralized Enterprise system, where data can be pushed into super-fast, stored securely, and be accessible to all stake holders, while facilitating super-fast and secure retrieval and sharing.

LoadProof is as important for your organization as an ERP (Enterprise Resource Planning) which is an enterprise system of record for critical documents such as Purchase Orders, Sales Orders, Contracts between parties etc. that have tremendous legal ramifications, or a WMS (Warehouse Management System), that holds indispensable information related to orders shipment/fulfilment data.

Just like Instagram, Facebook or Snapchat that have evolved into platforms that enable individuals to showcase how pretty they or their clothes are, LoadProof is a similar Enterprise system that holds photos, but for a different reason, not so much for show off, but to serve as proof, even in the court of law when there is a dispute between organizations while they perform many facets of their functions and operations, as well as for increased visibility within the Supply Chain.

Recently, Bosch implemented LoadProof in its facilities. This document describes the benefits they accrued from having an enterprise photo-documenting solution in place.



2. Bosch - Company Background

In 1886 in Stuttgart, Robert Bosch, an electrical engineer, founded Bosch in a backyard in Stuttgart-West as the *Werkstätte für Feinmechanik und Elektrotechnik* (*Workshop for Precision Mechanics and Electrical Engineering*). The next year Bosch presented a low voltage magneto for gas engines. Bosch soon became most involved in the automotive industry, and in the early 1890s the company introduced the manual engine starter. At the beginning of the 20th century, with the growth of the American car market, Bosch became the world leader in ignition systems. By 1914, 70% of the company's sales were in the United States.

With World War I, because of the embargo between Germany and the US, Bosch was prevented from doing more business in the United States and was forced to rely only on European sales in the conditions of war economy. The German economy was in a state of complete chaos after the war ended in 1918. The nation's fallout into a severe economic depression in the 1920s caused many businesses to fail. Bosch, however, managed to stay in business because of his good management. More talented as an administrator, Robert Bosch saw the need for greater innovation in industrial relations. He instituted an eight-hour work day and paid employees more, believing that better working conditions would encourage better employee performance. Bosch easily noticed the ability and creativity in his employees, assigning the most talented among them to positions in the most promising fields. He also saw the need for a diverse, high-quality product line as the most direct means of growth.

With the stabilization of the economic situation, public discontent began to grow in Germany. Bosch, who had expanded modestly during this period, bought the radio manufacturer Blaupunkt-Werke in 1933. That same year, Adolf Hitler's Nazis took power and initiated a new economic order characterized by rearmament and industrial growth. The company went through several periods of strong growth during the 1930s, due to the German military's great need for electronic and mechanical products. A new form of organization was needed for the company to grow. Robert Bosch passed away in 1942, leaving the legacy to Hans Waltz. As stated in Robert Bosch's will, ownership of the company was supposed to be transferred to the Robert Bosch Foundation at the end of 1964, with the estate remaining in the hands of the Bosch family.

The Bosch Group, nowadays, is a leading global supplier of technology and services. It employs roughly 402,600 employees worldwide. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT provider, Bosch offers innovative solutions for smart homes and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers solutions from a single



source. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.”

3. Bosch - Supply Chain Macro Picture

In a globalized world, digital technologies change markets, and sustainability is becoming a key factor. For Bosch, this means reacting with greater flexibility, speed and transparency to increasingly individualized customer wishes — while meeting highest quality requirements at the same time. This is a demanding task for the 30,000 employees of Bosch Supply Chain Management. Their work in the subfields of purchasing and logistics relies on automated processes and digitalization.

Bosch is relying on digitalization as a decisive competitive factor because of their core task to ensure robust and agile supply chains along the entire value stream. Innovative technologies and connected flows of goods — e.g. based on real-time data — help Bosch to maintain the highest standards continuously.

All suppliers have a quality management system that aims to ensure defect-free delivery right from the beginning of series production. As part of preventive quality assurance, Bosch coordinates the required measures at the outset of a project. Moreover, the purchasing teams work together with the suppliers on ensuring the continuous adherence to the demands in quality, for example by providing trainings.

Shaping a sustainable and innovative future, with a focus on digital transformation, for example in the area of Industry 4.0, is a declared goal of Bosch Supply Chain Management and its partners. The company is already a developer and pioneer in purchasing and logistics in many areas. This way, both divisions strengthen Bosch's long-term competitiveness with their strategic orientation and innovative strength.

One focus is the factory of the future — an important part of Bosch's IoT strategy. Driverless transport systems, for example, can be used to automate many internal transport processes. The real-time localization of vehicles, carriers, or materials is continuously becoming the focus of technological perspectives. After all, the strategic goal is and remains: supply chain excellence. Today — and even more so in the future.

The focus of Bosch supply chain management strategy is to ensure an all-encompassing competitive edge in terms of cost, delivery, quality, technology, and human resources in order to maximize synergy, speed, and efficiency with its suppliers and create a corporate ecosystem that enables sustainable growth.

In collaboration with their suppliers across the globe, Bosch take great care to operate a sustainable business ecosystem based on the philosophy of fairness, openness, and co-prosperity. This is why they support their suppliers to operate in adherence to global laws and standards to fulfil their environmental and social responsibilities. They hold their partners to very high standards, and perform regular annual audits. Among other things, these audits check if their partners keep to their standards of quality of delivery, which means On time delivery and On time shipping.

4. Bosch - Supply Chain Micro Picture

At Bosch, purchasing and logistics work hand in hand for resilient and sustainable supply chains that contribute to a high level of product quality, climate action, and social standards. Worldwide, Bosch employs some 9,400 associates in purchasing and around 21,000 associates in logistics. They are involved in the entire product evolution process – from the innovation phase to the start of production right through to the end of aftermarket supplies – and they work worldwide to secure Bosch's supply chain

excellence. The head of the Supply Chain Management corporate department reports directly to the member of the Bosch board of management responsible for finance. The corporate department coordinates internal and external requirements, establishes company-wide standards, and monitors their compliance.

Manufacturing materials are purchased based on a decentralized organization with responsibility awarded to the divisions. In contrast, materials and goods that are not directly related to products are procured centrally by indirect purchasing.

Transport management centers (TMC) have been established worldwide to manage shipments between suppliers, Bosch plants, and customers. We have already achieved a high degree of standardization in this area and can guarantee efficient transport – also with respect to environmental criteria – by pooling freight.

Bosch products are highly sensitive, which requires their very careful handling end-to-end. The products must be properly packaged with the appropriate protective materials and kept in loads of different sizes. Depending on the size of the product the number of loads varies. Before shipping, their warehouse personnel check for damages and prepare the appropriate paper work. They make note of the order number, PO number, load type, number of pieces and the store number to deliver. Products are shipped in trailers by road for stores within the state. Their packing may include cushioning within trailers. Shipping electronics requires paying great attention so that they reach retailers in perfect order and condition without broken seals, weather effects, or other damages.

Long distance shipments are handled by several transportation methods and require careful handling due to the fragile and easily damaged components of their devices. During the shipment's entire journey, products are exposed to various climate and weather conditions. To prevent negative elements effects on its shipments, particularly relevant for sophisticated electronics, Bosch' operations team does its job efficiently by packing and arranging loads properly. Their warehouse personnel bubble wraps, shrink wraps, takes care of temperature and light protection depending on product needs.

The warehouse manager completes all the quality checks and ensures that the product is shipped to the clients only after that. Usually, during the second shift, warehouse personnel capture the picture of the packaging, SKU bar code, PO bar code, and other inventory details before leaving the warehouse facility. These pictures can be presented as strong evidence to avoid chargebacks and free replacement for damage losses when retailers or customers could not see at which point of the transit something went wrong with the shipment.



5. What is the Problem?

Being a manufacturer and shipper of sophisticated technology, Bosch, deal with several universal issues, as well as some topics that are peculiar to them:

- a) In order to ensure the operational and product excellence they are famous for the Bosch operations team needs to make sure that products they source from external suppliers are of the highest quality. Adding an extra layer of transparency to their supply chain would support this objective.
- b) Delivering to a huge number of retailers, one of the major problems to Bosch were the dollars lost due to Chargebacks from Retailers.
- c) Technology and home appliances may be subject to damage during shipping very easily. Hence, the distribution team wants to present solid proof of their part in the delivery process to the retailer in case of mistakes that were not caused by them when the products were loaded.
- d) In case of claims for damages, the team would have to manually retrieve the photos captured during the supply chain process. It was a tedious job, and nobody liked to do it. Plus, it was not rare that they simply couldn't locate the photos in their manual archive. They would resort to explaining their side of the story clearly, but unfortunately, the clients were usually not satisfied with the explanation, which meant Bosch was left with the cost of the damage.
- e) Good relationships are lost with customers when the shipment is received in a damaged condition. It adversely affects the reputation of the company and also the overall operational cost of the company increases because of paying the damage claims. Due to a lack of supply chain visibility the customers and the company are often left to their resources to figure out where there was the error in the delivery process.
- f) Transparency is important for inhouse operations as well. Key aspects of any warehouse operations are efficiency and accountability – people need to work fast, and well. In order to maintain their excellence, Bosch was looking at ways in which an extra layer of transparency would be added for the purpose of internal audits, as tools that could improve inhouse operations and increase accountability.



Being leading technology manufacturing company, they wanted to make sure that their level of service quality was solid enough to retain their old customers and bring in new ones. In spite of putting in a lot of effort to maintain operational excellence, the complexity of their supply chain structure and the lack of visibility meant that the company often encountered losses due to chargebacks and damages.

6. Solution

That's when they turned to LoadProof. After a demonstration of the solution, they implemented LoadProof in three of their DCs in USA.

LoadProof is a picture documentation tool that enables DC managers and operators to take pictures of the condition of the outbound loads so that they can prove they did their job right. LoadProof is the Optimal solution that solves all the above listed problems resulting in savings of millions of dollars. LoadProof does all this with minimal change management.

Since implementation, they have used LoadProof to capture the photo of the product once the packaging and quality checks were done by the team. Photos can be accessed by everyone in their network, from the admin to the warehouse site personnel. Using LoadProof, the product can be easily tracked with the help of a GPS tracking system to avoid chargebacks. The captured photo is uploaded automatically in a safe Cloud and filed according to its metadata. If a complaint is raised by the retailer over damages, the warehouse personnel can easily retrieve the captured photo of the load to ensure the mistake was not done by them. Also, the supply chain process is now see-through to find where the mistakes happened exactly. This has led Bosch to avoid chargebacks and save on free replacement of damaged products. The warehouse team is completely satisfied by using LoadProof to capture and upload the photos in a single click with just one man able to do the job. They are being saved from damage claims and assign lesser manpower for the photo retrieval process.

7. What are the capabilities that Bosch obtained with LoadProof?

LoadProof is a Centralized Enterprise Photo Documentation System used at Bosch. It improves the supply chain visibility by allowing for an easy way to capture, share, and retrieve photos of shipments and documents, in order to avoid claims and enhance the trust with customers.

7.1 Super-fast Photo Capture

After downloading the LoadProof app from the app store, Bosch users are able to take pictures using their mobile devices in a few seconds and then upload those pictures to the cloud tagging the pictures with appropriate contextual data elements. While uploading pictures Bosch' warehouse personnel are able to add notes, are also able to tag the pictures with the following:

- a) User that captured the photos.
- b) Date when the photos are captured.
- c) Time when the photos are captured.
- d) GPS coordinates of the location where the photos are captured.
- e) Device that was used to capture the photos.
- f) Android OS version that was running in the device that was used to capture photos.

The pictures are captured in multiple resolutions based on the plan; the different resolutions that are available are Low Resolution, Medium Resolution and High Resolution. Bosch personnel uses high resolution pictures to capture pictures of documents such as Packing Slip, Bill of Lading, and Trailer Inspection Form.



7.2 Super-Fast Photo Retrieval

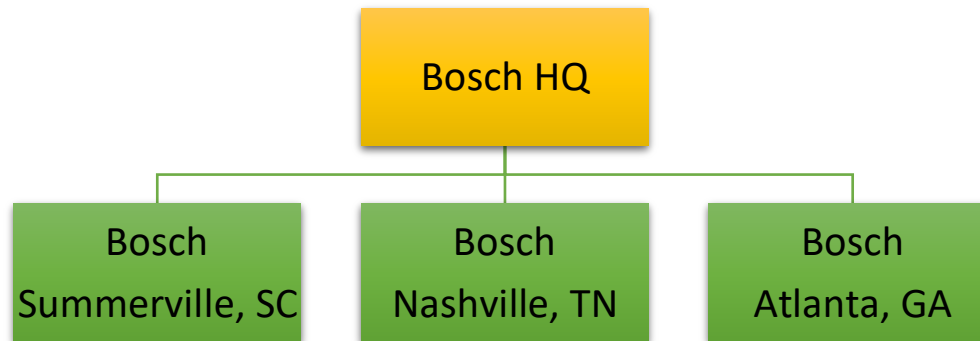
So now the photos are uploaded to the LoadProof cloud, users can easily log on to the LoadProof cloud through the browser and look up photos from wherever they need to. Users log on to the cloud the browser by providing their credentials, which includes a user ID and password. Then users are able to input one or more of the contextual data that had tagged the pictures with and then perform a super-fast search. Now users can retrieve the pictures they need, drill down further and look at the pictures individually, zoom in, zoom out, save them locally if they need to (not recommended often) and also examine any notes that was entered and also look at the date stamp, time stamp, GPS coordinates etc. if there is a need to validate any of these data set for each picture.

7.3 Super-Fast Photo Sharing

After retrieving photos, users can share the pictures with anybody else, usually customers, vendors, partners, carriers, cross dock facilities, insurance companies, claims processors, Retailers, consolidation facilities etc. in multiple ways as listed below,

- a) By generating one PDF document for the entire load.
- b) By sending the entire load to a customer by inputting an email address.
- c) By setting up a customer as a user within LoadProof.
- d) By generating a LoadProof URL for each picture and then sharing that URL in an email.
- e) By generating multiple LoadProof URLs for all pictures and then sharing those URLs in an email.

7.4 Enterprise Supply Chain Network Architecture



1. Bosch has corporate level users set up that have visibility to look at Photos across all the sites
 - a. These users could be Photo taker users or Photo viewer users or both
 - b. These users could also be Admin users or non admin users
2. Bosch also has Network level users that have visibility to look at the Photos at the Supply Chain Network level.
 - a. These users could be Photo taker users or Photo viewer users or both
 - b. These users could also be Admin users or Non admin users
3. Bosch has site level users that have visibility to look at the Photos at the site level
 - a. These users could be Photo taker users or Photo viewer users or both.
 - b. These users could also be Admin users or Non admin users

7.6 Integrations with other Systems

- a) LoadProof supports integration with other systems.
- b) LoadProof is already integrated with Mercury Gate, My Ez Claims System. My Ez Claims is a Freight Claims Processing system that helps shippers process their Freight claims with multiple carriers faster and easier.
- c) LoadProof can be integrated by setting up a field to look up from any other system using a hyperlink so that LoadProof data can be pulled into a browser directly by clicking a link in the external system.

8. What are the Benefits?

“[LoadProof] is a vital program to our operation and prevents us from being responsible for damages to product after it leaves our warehouse because we can prove the load was not damaged when it left our warehouse”, says **Denise Agudelo, Business Analyst at Bosch**. It is a simple yet extremely effective way to improve the supply chain transparency in their DCs. Not only is retrieving data much easier, but the consistency in completing internal audits to improve processes improved. They could give the right kind of attention to more important parts of their operations now, without wasting precious time on manual tasks.

8.1 Measurable Hard Benefits

1. Now that there is one centralized place to get the photos from, and retrieval of photos is super easy, Bosch personnel can retrieve photos in a matter of seconds instead of spending hours on end looking for them. All the time related to this activity is saved now.
2. Bosch operators are doing a much better job, now that everyone knows the quality of the work they are doing is being documented. This directly results in improved customer satisfaction rating: customer satisfaction surveys show improvement on customer satisfaction ratings and hence the relationship with the customer has significantly improved.
3. With the centralized sharing of photos made super easy, all Bosch personnel have to do is put in the email address and push a button, and the person on the other end gets the photo within minutes. There are no more back and forth conversations wasting time. All the time related to this activity is saved now.

8.2 Intangible Soft Benefits

1. Everybody at Bosch feels good about the centralized Photo documentation system. Nobody is losing sleep over damage claims, OS&D, accountability or quality issues.
2. The visibility gained in all the steps of the process to ensure production and shipping are going flawlessly is excellent. Processes are simplified across all teams, making the operations perform better. If there is any complaint, we can immediately pull the photos. The visibility has enhanced transparency, so the trust with our partners have improved significantly, our reputation in the industry has improved as well.
3. Ability to set up multiple facilities and multiple personnel at the facility level and at the corporate level is very helpful also. It has eliminated unnecessary calls quite a bit, nobody has to wait for the other person to respond.
4. It made everyone in their supply chain to be accountable for whatever actions they do. This resulted in better discipline and work culture in their supply chain as a whole.

9. What are the Cost Savings?

The savings are summarized below under different sections as appropriate.

9.1 Savings due to implementing a Centralized Enterprise class Documentation System for Photos & Videos

# of Hours saver per facilities per week	25
# of facilities	3
Hourly rate of employees that manage these photos	\$20
Total Savings in a year per facility	$25 \times \$20 \times 54 = \$27,000$

Total Savings across 3 facilities per year	\$27,000 X 3
Total Savings per year within the entire Supply Chain Network	\$81,000

9.2 Savings due to reduced retailer chargebacks, also known as vendor or retail chargebacks

Average # of the shipments in a month	400
# of facilities in supply chain network	3
Average value of a shipment	\$20,000
Average value of all shipments in one facility in one year	$\$20,000 \times 400 \times 12 = \$96,000,000$
Average \$ lost (0.5% damages) due to chargebacks submitted by customers in one year in one site	\$480,000
Average \$ lost (0.5% damages) due to chargebacks submitted by customers in one year across all 3 sites	$\$480,000 \times 3 = \$1,440,000$
With LoadProof that dollars lost is reduced to 20%, hence the savings are 80%, or:	\$1,152,000

The dollars lost due to reduced retailer chargebacks result in \$1,440,000

With LoadProof, that is reduced by 80%. Hence the savings are 80%, which is \$1,152,000

Industry Numbers: The damage claims vary around 2% as per industry.

9.2 Savings due to less Rejected Loads and Reduced Damage claim submitted by customers

Average # of the shipments in a month	400
# of Facilities in supply chain	3
Average value of a shipment	\$10,000
Average value of all shipment in one facility in one year	$\$10,000 \times 400 \times 12 = \$48,000,000$
Average \$ lost (0.5% damages) due to rejected and damages claims submitted by customers in one year in one site	\$240,000
Average \$ lost (0.5% damages) due to rejected and damages claims submitted by customers in one year in all 3 sites	$\$240,000 \times 3 = 720,000$
With LoadProof that dollars lost is reduced to 20%, hence the savings are 80%	\$576,000

The dollars lost due to rejected loads and damages claims submitted by customers result in \$720,000

With LoadProof, that is reduced by 80%. Hence the savings are 80%, which is \$576,000

Industry Numbers: The damage claims vary around 2% as per industry.

9.3 Savings due to faster processing of Freight claims

Average # of the shipments in one facility in one year => 400 shipments per month x 12 months	4,800
# of Facilities	3
Average # of shipments within the supply chain network in one year across 2 sites	14,400
Hourly Rate of employees that manage these photos	\$20

Estimated # of shipments (1% of the total shipments) that results in Freight claims within the supply chain network	144
Hours saved with faster processing of freight claims within supply chain network (12 hours saved per freight claim)	144 x 12 = 1,728
Total dollars saved = 1,728 X \$20/hour	34,560
Total Savings/Year within Supply Chain Network due to faster Freight Claims Process	\$34,560

The total savings with faster processing of Freight claims \$34,560

Industry Numbers: Average number of Freight claims issued for Outbound shipments is approximately 1% of the number of shipments, Bosch is around 1% which results in savings of \$34,560 across their supply chain network due to the faster processing of Freight claims.

9.4 Total Savings per Year

Savings due to Centralized Photo Documentation System	\$54,000
Savings due to reduced retailer chargeback	\$768,000
Savings due to reduced rejected and damages claims by customers	\$576,000
Savings per year due to faster processing of freight claims	\$34,560
Total Savings	\$1,229,040

10. Insights

- If you are shipping high value products, when the damage occurs, the loss incurred is too much and somebody has to pay for that loss. It is usually the warehouse because the receiver only knows the warehouse that shipped the product, and the receiver does not have any visibility to the other supply chain partners that touched the product during transit. So, all they can do is point fingers at the warehouse and say the warehouse messed this up. This is where the warehouse personnel need to have photo proof in order to prove that they did their job right. LoadProof helps with proving the point that the warehouse indeed shipped the product. When this proof is made available from the warehouse side, Bosch does not have to incur the cost and also doesn't have to replace items for free.
- When you are shipping to brick-and-mortar stores and the product does not get delivered on time or if the product is delivered with damages, the supplier is held responsible for the delay by the retailer or customer. Clients can not only claim refunds but possibly stop ordering products, they do not realize the company's lack of fault because they do not have visibility to the other supply chain partners that touched the product during transit. So that is where the company administration needs to have photo proof in order to prove that they did their job right. LoadProof helps with proving the point that the warehouse indeed shipped the product in perfect condition. When this proof is made available from the company's side, Bosch does not have to incur the cost and also does not have to replace the items for free.
- In order to handle situations where you need to prove the condition of loads to your customer as well as the retailer, having photo proof helps a lot. And especially when that photo proof is from an enterprise system where in the photos are tagged with user, date stamp, time stamp, GPS stamp, it adds even more credibility. Also, when that is automated such that the receiver themselves can take a look at it without you even lifting a finger, that makes your life so much easier. You are not constantly wondering when you are going to get that chargeback email, instead you are focused on doing your job well and documenting everything you do with the utmost sincerity, so you can serve your customers well.

- d) If somehow your customer has lost trust in your services, LoadProof is a powerful way to show them that you are doing a great job and in the end you care. By documenting everything you do in the form of photos and making it available to them in a form where they can very quickly search and look at the photos over a period of time, helps win that trust back and hence better customer satisfaction rating a long-term relationship.
- e) Another benefit is that when warehouse operators in your facility realize that the quality of the work they do is being documented, they do a better job, their quality of work improves and that results in better customer satisfaction and better long-term relationship with the customer.
- f) When warehouse operators realize that they are doing a great job and know that their work is being documented with photo proof, the overall operator morale improves, also the operators trust the systems, the operations, the leadership team, and the overall management, resulting in better trusting, truly collaborating culture and work environment.