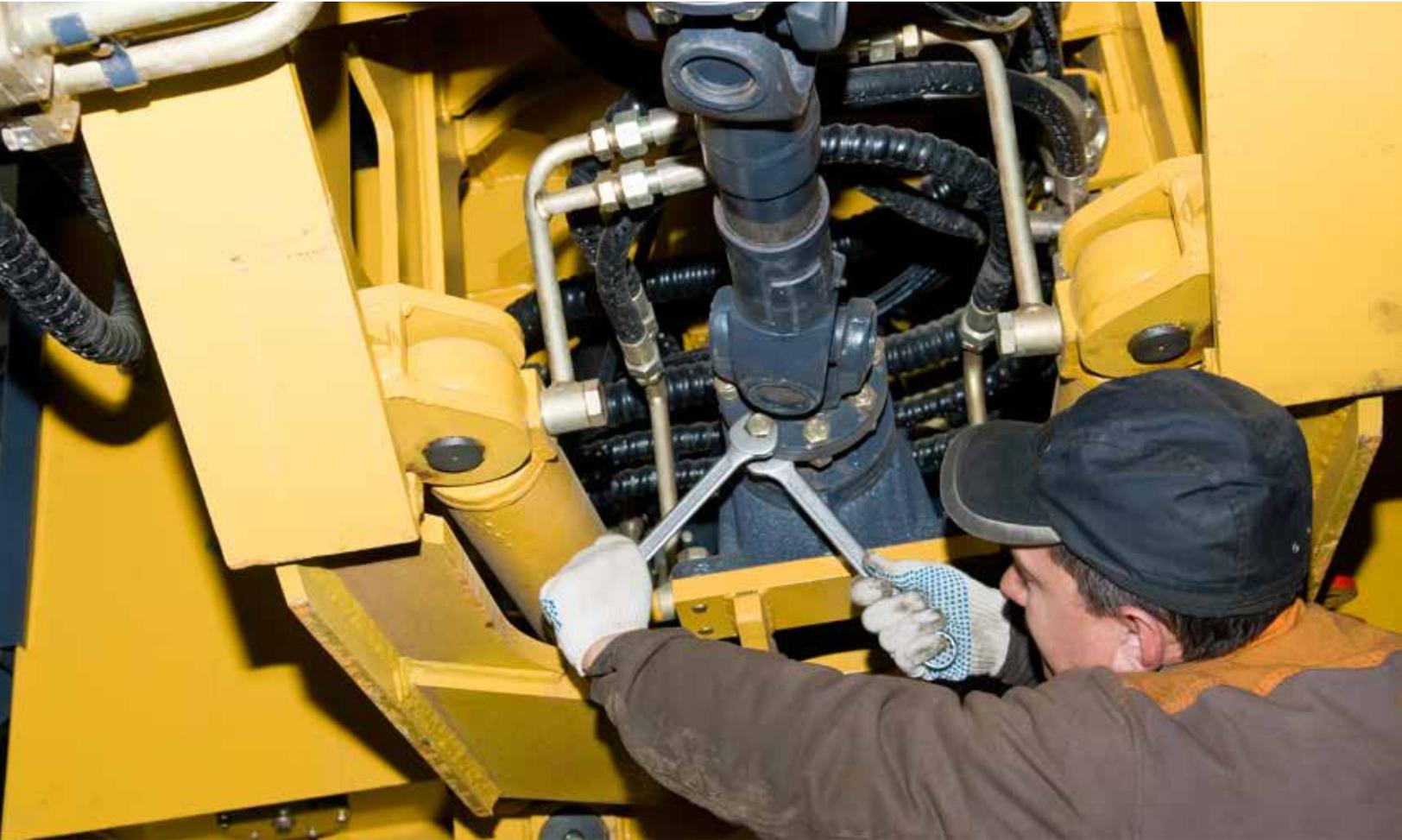


# Controlling Warranty Costs by Preventing No Fault Found



Part of your business

# Global competition is pushing manufacturers to further reduce costs, increase efficiency and improve product quality.

Mobile machine manufacturers today are struggling to reduce costs. Reductions in component costs and increases in productivity are not having the impact they once had, causing manufacturers to look elsewhere for further cost reductions.



Mobile machine manufacturers warranty costs are as high as

**\$800  
Million**

per year depending on the size of the company and the machinery they produce

That amount is equal to as much as

**3%**

of product revenues, which is almost double what other industries spend.



## Many warranty claims result in No Fault Found (NFF).

Mobile working machine manufacturers have reported that nearly

**50%**

of components that have failed during the warranty period are later determined to have No Fault Found, where returned components are determined to still be in working condition once analyzed by the manufacturer.

This alarmingly high No Fault Found rate is a result of more complex electrical systems, field repair technicians not being properly trained and not having the right tools to properly diagnose the machine. Whatever the cause, the result is that good components are replaced by field technicians in an effort to fix the underlying problem, especially when equipment uptime is paramount, and the repair is covered by the manufacturer's warranty.

# Components with No Fault Found could be costing your company millions of dollars each year.

Replacing a component in the field can be expensive. The cost depends to a large extent on what the repair company charges for the service. On average the cost is \$350 to replace a component during the warranty period, because you not only have to pay the repair company, but also cover administrative costs of processing the warranty claim. How much are No Fault Found components costing your company each year?

Number of failed sensors / year	Percentage of NFF sensors					
	20%	30%	40%	50%	60%	70%
1,000	\$70,000	\$105,000	\$140,000	\$175,000	\$210,000	\$245,000
2,000	\$140,000	\$210,000	\$280,000	\$350,000	\$420,000	\$490,000
3,000	\$210,000	\$315,000	\$420,000	\$525,000	\$630,000	\$735,000
4,000	\$280,000	\$420,000	\$560,000	\$700,000	\$840,000	\$980,000
5,000	\$350,000	\$525,000	\$700,000	\$875,000	\$1,050,000	\$1,225,000
6,000	\$420,000	\$630,000	\$840,000	\$1,050,000	\$1,260,000	\$1,470,000
7,000	\$490,000	\$735,000	\$980,000	\$1,225,000	\$1,470,000	\$1,715,000
8,000	\$560,000	\$840,000	\$1,120,000	\$1,400,000	\$1,680,000	\$1,960,000
9,000	\$630,000	\$945,000	\$1,260,000	\$1,575,000	\$1,890,000	\$2,205,000
10,000	\$700,000	\$1,050,000	\$1,400,000	\$1,750,000	\$2,100,000	\$2,450,000
11,000	\$770,000	\$1,155,000	\$1,540,000	\$1,925,000	\$2,310,000	\$2,695,000
12,000	\$840,000	\$1,260,000	\$1,680,000	\$2,100,000	\$2,520,000	\$2,940,000
13,000	\$910,000	\$1,365,000	\$1,820,000	\$2,275,000	\$2,730,000	\$3,185,000
14,000	\$980,000	\$1,470,000	\$1,960,000	\$2,450,000	\$2,940,000	\$3,430,000
15,000	\$1,050,000	\$1,575,000	\$2,100,000	\$2,625,000	\$3,150,000	\$3,675,000
16,000	\$1,120,000	\$1,680,000	\$2,240,000	\$2,800,000	\$3,360,000	\$3,920,000
17,000	\$1,190,000	\$1,785,000	\$2,380,000	\$2,975,000	\$3,570,000	\$4,165,000
18,000	\$1,260,000	\$1,890,000	\$2,520,000	\$3,150,000	\$3,780,000	\$4,410,000
19,000	\$1,330,000	\$1,995,000	\$2,660,000	\$3,325,000	\$3,990,000	\$4,655,000
20,000	\$1,400,000	\$2,100,000	\$2,800,000	\$3,500,000	\$4,200,000	\$4,900,000
21,000	\$1,470,000	\$2,205,000	\$2,940,000	\$3,675,000	\$4,410,000	\$5,145,000
22,000	\$1,540,000	\$2,310,000	\$3,080,000	\$3,850,000	\$4,620,000	\$5,390,000
23,000	\$1,610,000	\$2,415,000	\$3,220,000	\$4,025,000	\$4,830,000	\$5,635,000
24,000	\$1,680,000	\$2,520,000	\$3,360,000	\$4,200,000	\$5,040,000	\$5,880,000
25,000	\$1,750,000	\$2,625,000	\$3,500,000	\$4,375,000	\$5,250,000	\$6,125,000
26,000	\$1,820,000	\$2,730,000	\$3,640,000	\$4,550,000	\$5,460,000	\$6,370,000
27,000	\$1,890,000	\$2,835,000	\$3,780,000	\$4,725,000	\$5,670,000	\$6,615,000
28,000	\$1,960,000	\$2,940,000	\$3,920,000	\$4,900,000	\$5,880,000	\$6,860,000
29,000	\$2,030,000	\$3,045,000	\$4,060,000	\$5,075,000	\$6,090,000	\$7,105,000
30,000	\$2,100,000	\$3,150,000	\$4,200,000	\$5,250,000	\$6,300,000	\$7,350,000

Table based on \$350 cost to replace component during warrant period.



## Case Study: A simple component change causes pressure sensors to be replaced at an alarming rate.

In an effort to cut costs, one manufacturer incorporated a new hydraulic pump design across their entire product line. Undiscovered during the testing and validation process, the new hydraulic pump was creating undetectable pressure ripples in the hydraulic system. To make matters worse, the existing pressure sensors were not designed to handle the pressure ripples, and would fail in the field at an alarming rate. After repairing dozens of machines the field technicians became so familiar with the problem that they would just replace all the pressure sensors on the machine whether they knew they

were working or not. This practice not only caused a huge increase in warranty claims, but also prevented the manufacturer from fully understanding why the pressure sensors were failing in the first place.

The manufacturer's warranty costs from No Fault Found pressure sensors was over \$2.6 million by the time the problem was located. As the manufacturer implements a solution they are still incurring warranty claims due to No Fault Found pressure sensors.



### Summary: The manufacturer's warranty costs per year from NFF sensors were the following:

Sensor Usage .....	50,000	(100%)
Sensor Failures .....	15,000	(30%)
NFF Sensors .....	7,500	(15%)
Warranty Costs .....	\$350	
<b>Total Costs .....</b>	<b>\$2,625,000</b>	



## Preventing pressure sensor No Fault Found.

What if your company could have a pressure sensor that would tell the field technician if it was working properly or if it had failed? What if that very same pressure sensor could tell the technician where on the machine it was located? Imagine the amount of money that could be saved if this was possible. There is technology available that solves this very problem, and it's called on board diagnostics (OBD). You have probably heard of this before — diagnostics are widely used in the automobile industry, aerospace industry and many other industries, to speed troubleshooting and prevent warranty claims from No Fault

Found components. A pressure sensor with OBD would have a diagnostic signal, that upon sensor failure, would communicate with the machine's computer alerting it to the problem. The field technician could access this data and if the diagnostic signal was present, would know to replace the sensor. More importantly if the pressure sensor did not show the predefined diagnostic signal the field technician would know not to replace the sensor, saving the manufacturer the hassle and costs associated with processing a warranty claim.

# WIKA's MH-3 pressure sensor reduces warranty claims.

WIKA has a long history of producing pressure sensors for mobile working machines. In consultation with leading companies in the market we have developed the MH-3, which is the first OEM pressure sensor designed specifically for mobile working machines to include diagnostics. The pressure sensor can be configured by the manufacturer to meet their unique software requirements, and not only has the ability to indicate permanent failures, but can also indicate temporary failures like overpressure and under-pressure. The MH-3 with diagnostic capability provides field technicians with a clear indication of

the pressure sensor's operational status. This feature drastically reduces the unnecessary replacement of working components, which reduces No Fault Found warranty claims, saving your company millions of dollars each year. The best part: the MH-3 is designed to be a cost-neutral alternative to your current pressure sensor solution.

**Contact a WIKA specialist today to learn more at (888) 945-2872 or visit [www.wika.com/mh3](http://www.wika.com/mh3).**



## Diagnostic Function

Allows field repair technicians to quickly and accurately identify problems.



## Signal Clamping

Helps to prevent a momentary shutdown, or worse—erratic machine operation.



## Save on Warranty Costs

Reduce the amount of No Fault Found claims with the ability to check the health of a sensor in the field.

# WIKA, your partner for mobile working machines measurement solutions



- Electrical pressure
- Electrical temperature
- Mechanical pressure
- Mechanical temperature
- Force & Load
- Level

**WIKA Instrument, LP**  
1000 Wiegand Blvd., Lawrenceville, GA 30043  
Tel. (888) WIKA-USA · (888) 945-2872  
info@wika.com · www.wika.com

B047-2000 10/15  
WIKA® is a registered trademark of WIKA Alexander Wiegand SE & Co. KG., used under license by WIKA Instrument, LP.  
Copyright 2015 WIKA Instrument, LP. All Rights Reserved.

