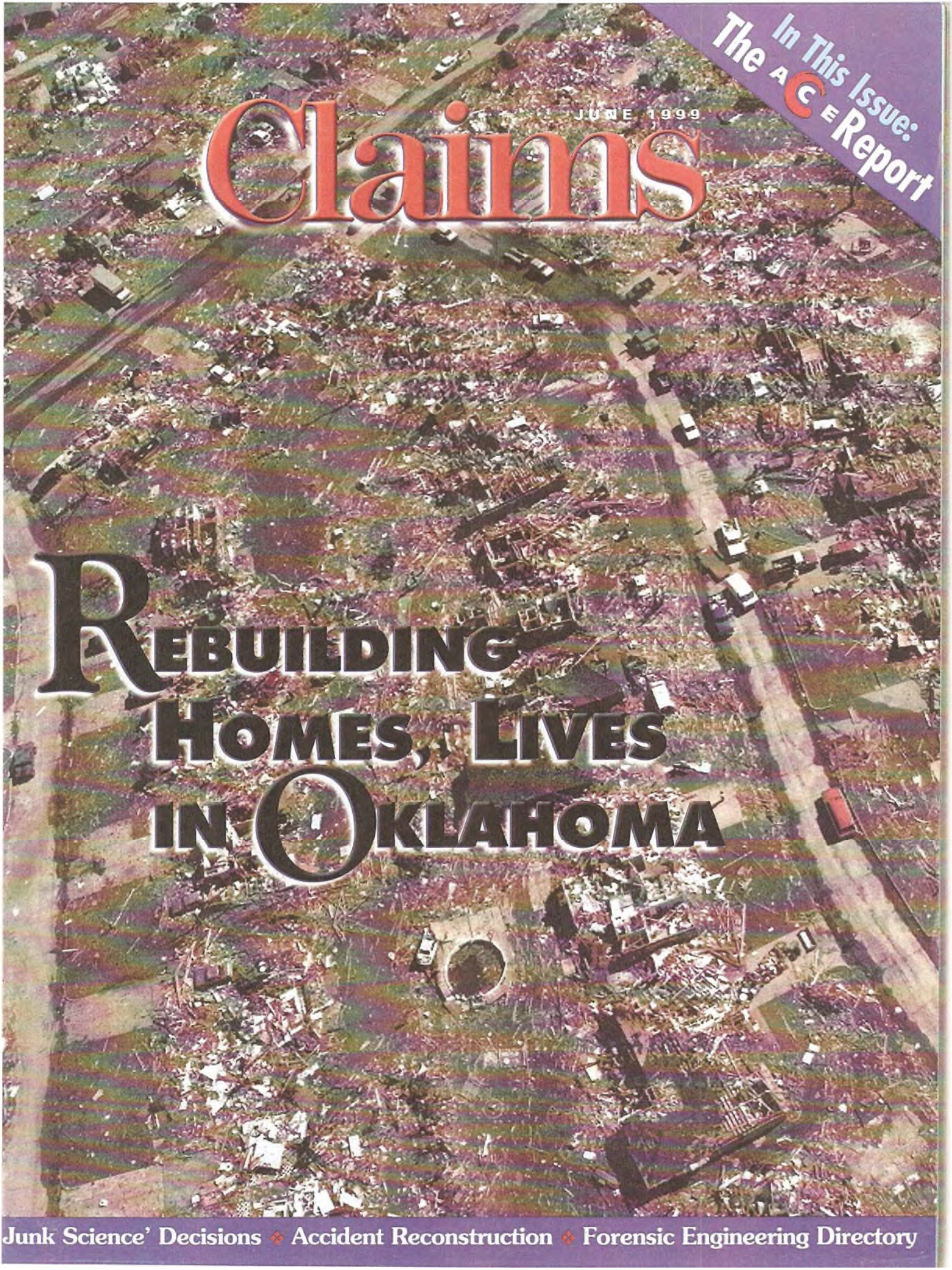
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Coordinates & Camera Angles

Don't Take Shortcuts with Forensics

By Jay Gallagher

Good field adjusters, whether independent or staff, are able to think on their feet, document damages and establish rapport with claimants, witnesses and insureds. In general, they are the company's eyes in the field.

Often, good field adjusters are asked to do all of the above in a very short period of time, if not simultaneously. To that end, field adjusters sometimes have to take shortcuts, relying on the police investigation or a hastily conducted, cursory scene investigation so that they can set about gathering the "meat" of the file: securing vital witness statements and making the all-important claimant contacts before the parties scatter to the four winds.

When field adjusters do take shortcuts, it's ostensibly a concession to the time constraints inherent to providing good customer service. The adjuster knows that if liability is questionable on a large loss, a forensics expert will undoubtedly come in afterwards and dot all the i's and cross all the t's. Most adjusters rationalize that it's precisely because they are *not* experts that excessive adjuster time spent on the scene is of little value if the other side hires an expert of its own.

However, any excuse that an adjuster uses to justify a less-than-thorough examination of the accident scene is specious reasoning, no matter how well intended or thought out. Without a very thorough and systematic investigation at the scene, documenting the above items, the field adjuster may do a disservice to the client or the employer.

A diligent adjuster can enhance a company's defensive posture by liberal use of a camera and adoption of the Cartesian coordinate system of measurement (used in some form by most experts) to accurately document damages at the scene and on involved vehicles.

What is it?

If the Cartesian coordinate system sounds vaguely familiar, you're probably having flashbacks to high school algebra and geometry. In a nutshell, the Cartesian coordinate system is named for René Descartes, a frail and sickly, but brilliant, mathematician who first devised it. As Descartes lay bedridden, he watched a fly crawl about on his wall and realized that it was possible to accurately fix the fly's position on the wall at any given time by taking measurements to that position from two adjacent sides.

As we found out in high school, these measurements are taken along two perpendicular axes or lines, such as the lines formed by the intersection of the planes represented by the wall upon which

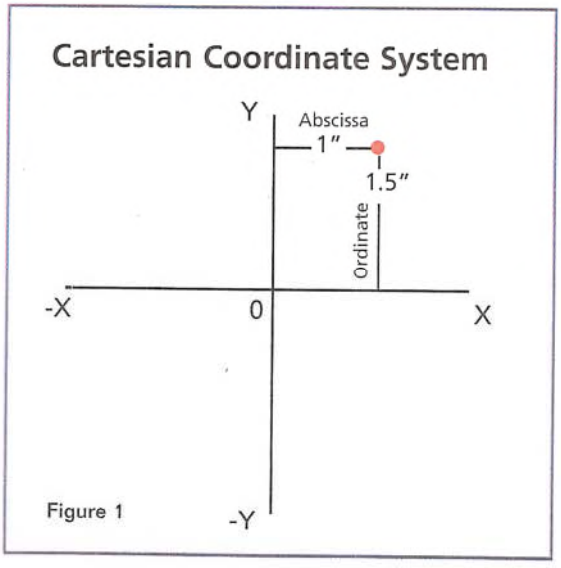
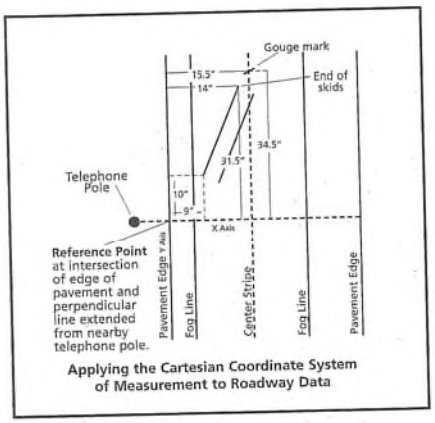


Figure 1



Applying the Cartesian Coordinate System of Measurement to Roadway Data

Figure 2

the fly crawled, and an adjacent wall and the intersection of the fly's wall with the adjacent floor or ceiling.

Descartes dubbed the vertical ascending line formed by the intersection of the fly's wall and an adjacent wall the Y axis, and measurements made along that line are known as the ordinate. The horizontal line formed by the intersection of the fly's wall and the floor or ceiling is the X axis and measurements along that line are called the abscissa. The intersection of any two lines running perpendicular to the ordinate and abscissa is called the origin (see Figure 1).

In the case of accident investigation and documentation, the diligent adjuster would view the road surface as a plane, using the pavement edge, fog line or curb line as the Y axis. An origin, or reference point, can be determined as the position at which the Y axis crosses some type of immovable landmark that's not likely to change, such as a culvert or an expansion joint, or, if none exists, the point at which a perpendicular line is extended from a nearby telephone pole or other immovable object, forming the X axis. Tangents can also be extended from the curb lines of intersecting streets and used as the origin.

From that reference point, ordinate measurements are made, either up or down, along the Y axis and abscissal measurements are made out along the perpendicular X axis, to the point being measured. Each position being marked will have two distinct measurements. For instance, a vehicle that left skid marks from the tires on its left front wheels would have two measurements denoting the beginning of the left skid mark and two measurements denoting the termination of that skid mark. Skid marks from the right wheels would be documented similarly (see Figure 2).

Not only can accident scene investigations be conducted with the Cartesian system, it can be used to document vehicular damages and even fire scenes. In the case of structural collapses involving several layers of debris, measurements can be made in three dimensions, using the two X and Y measurements described above, plus a third, Z axis, to locate the depth of specific, pertinent pieces of debris found at different levels. This is often referred to as a Newtonian system of measurement.

As powerful a tool as the Cartesian coordinate system is, it doesn't fit every situation and, accordingly, many investigators and reconstructionists use an adaptation, called the curvilinear system, to document accident scenes involving roads that curve or turn. The scene is mapped out in much the same fashion, and measurements are again taken from a reference point up or down along the Y axis, which curves, and then either in or out along a perpendicular X axis to the position of a point being measured (see Figure 3).

Worth the effort

Though it's more time-consuming than working off the police report or simply snapping a few photos, the time spent learning how to use the Cartesian coordinate system can pay big dividends.

"When an adjuster properly notes the position of data at the scene, it absolutely makes our job much, much easier," said Mike James, owner of Stress Dynamics, an engineering and recon-

struction firm based in College Station, Texas. "We can go to the scene and relocate those positions relatively quickly."

Forensics can only take you marginally farther than the underlying investigation. This is particularly so in those cases where an expert isn't retained until late in the game, as often the evidence upon which a forensics expert relies to formulate his opinions ceases to exist. Skid marks evaporate or wash away in rains; gouge marks weather with age and become indistinguishable; vehicles get moved, sold, repaired and/or destroyed; and other pertinent information simply gets disposed of.

"When [locations] aren't properly marked, especially if some time has passed between the date of accident and our involvement, it makes our work extremely difficult," James added. "We have to spend a great deal of time at the scene relocating the positions of pertinent evidence, if it still exists, and all too often there's nothing in the file beyond a few photos to show the extent of the damage to the vehicles involved."

As if these issues aren't problematic enough, questions of accuracy on both adjuster investigations and police reports remain. Police officers have as demanding a job on the scene, if not more so, than an adjuster. The depth of the investigation is usually not as great as the adjuster's, but demands on the officer's time at the scene are much greater. Often, the officer is called upon to make snap decisions that ultimately affect events at trial two or three years later, while five different adjusters will probably use five different methods of documenting evidence at the scene.

"We rarely see cases where the field adjuster documents all the things that we'll ultimately need to consider, and we are forced to spend our time reworking the scene before we're able to set about actually analyzing the facts of a particular case," James said.

Coordination with the camera

As with any investigation, the Cartesian system of measurement is best used in conjunction with photographs of the items being documented. Experts have, for years, adapted this systematic approach to the proper measurement of accident scenes and, in addition to skids, gouges and debris locations, it can be used to plot the exact points of visual obstructions, the positions of witnesses and other pertinent positions. With these exact measurements, the forensics expert's opinions can be much more precise.

One often overlooked area of adjuster investigation is the degree of

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◀Cartesian,
continued from page 49

damage to the involved vehicles. In most cases, the insurance carrier has appraisals done, but little in the way of exacting measurement is performed. Most vehicles are then either repaired or destroyed before the expert can look at them, compounding the difficulties.

Generally, companies document physical damage with an eye toward holding file costs down and a reconstructionist often has to work off of four "corner shots" if the vehicle is unavailable, making certain aspects of reconstruction more difficult than they have to be.

"Corner shots are almost useless to us when we try to do certain things like crush energy calculations," said Dale Anderson, of Louisiana Tech University in Ruston, La. "It's preferable to have actual measurements of the depth of crush damage, but if you can't have those, we can work off of photos, provided that they're taken square on [perpendicular] from the sides and the front and rear. It's not as accurate as taking actual measurements and it opens you up to more questions."

In addition to taking shots squarely from the sides, it is possible to take photos under and above the vehicle, particularly if the vehicle is in a salvage yard at the time of your inspection. Ask the salvage yard's forklift operator if he can hoist you above the car so that you can shoot directly down into the area of damage, or if he can raise the vehicle so that you can measure and photograph areas of the undercarriage that may have come in contact with the road surface.

With accurate measurements of gouge marks and corresponding damage to the undercarriage of a vehicle, you can greatly aid the reconstructionist's efforts. Often this type of documentation can help you refute inaccurate police reports and faulty witness recollections.

"When you take measurements of a vehicle that's been involved in a wreck and you're documenting crush damages, start with the undamaged areas, if there are any, and measure back toward the damaged areas," James advised. "For instance, on a vehicle that's been hit from the rear, measure from the front edge of the vehicle back along the driver's side to the front axle, the roof support pillars and to the rear axle and back to the damaged areas at the rear of the vehicle. Measure slightly beyond the damaged areas and establish an axis to use as a reference point.

"From that reference, measure back toward the front of the vehicle into the damaged areas," he continued. "Make your measurements in regularly spaced increments along the reference axis at the rear of the vehicle from the driver's side over to the passenger side. With measurements of the depth of the crush and photos which show the entire length of a vehicle and the depth and shape of the crush, we can provide very accurate calculations regarding the speeds and angles at impact."

"It's very important if you can get to a car before it's destroyed to get good base measurements: the front and rear wheel track widths as well as the wheel base length and overhangs of the body in the front, the rear and on the sides," Anderson said. Additionally, these measurements can be compared to those taken from an exemplar vehicle and used to calculate crush energy calculations and angles of impact.

These seemingly innocuous measurements can aid the reconstructionist in the forensic part of the investigation: deciphering the chaos of data at the scene — including multiple overlapping skid marks, yaw marks and the converging marks left by spinning vehicles — so that the reconstructionist can paint a clear picture of what actually happened. But without a thorough, systematic investigative job at the scene by the adjuster or, in the alternative, immediate expert involvement, engaging a forensics expert is often too little too late. ▲

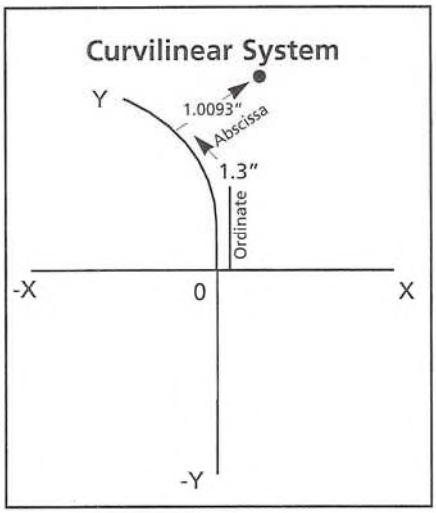

Figure 3

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