

Engineers and race teams who are new to K&C testing often want to get a better understand of how K&C testing works and what they can learn in a test session. K&C testing at Morse Measurements is flexible to meet a wide range of needs, however the following examples represent the typical types of test goals and objectives that are undertaken.

Example 1: Specific Measurements

Client Goal: "We don't have much time, but we would like to bring a single car into the Morse Measurements shop and find our roll centers and maybe measure the roll stiffness for a few different sway bar setups."

Typical Time: 1/2 - 1 day

Typical Cost: *contact Morse Measurements*

Test Overview: Basic K&C testing can determine kinematic and/or force-based roll centers for both axles. Roll stiffness tests can be run quickly, and offer the advantages of proper axle loading and scrub relief. These tests, including vehicle loading & unloading can be completed in about ½ day. The roll stiffnesses, roll centers, and other parameters of interest are reported directly in real-time summary reports.

Example 2: Vehicle Modeling

Client Goal: "We want to run some K&C tests on a single vehicle to help build a model for CarSim® v8.0."

Typical Time: ½ - 1 day

Typical Cost: *contact Morse Measurements*

Test Overview: A series of K&C tests will provide the data necessary for front & rear suspension models, steering system models, and some chassis modeling in the CarSim® environment. Morse Measurements can also provide additional part measurements beyond K&C testing that can help with model building (damper characteristics, unsprung mass measurements, etc.). As a supplement to the actual test data, Morse Measurements will provide an expanded pars file that will import directly into CarSim®.

Example 3: Vehicle Comparison

Client Goal: "We have two race cars that we want to compare. One car handles good. The second car is set up identically, but our driver says it's different and doesn't like it. Can K&C testing show us anything?"

Typical Time: 1 day

Typical Cost: contact Morse Measurements

Test Overview: A series of basic K&C tests will highlight the differences between key chassis and suspension characteristics. If there's something different between the cars, we'll find it. We'll test the "baseline" car in the morning, then we'll overlay the second car's measurements real-time in the afternoon. We'll make note of the differences that we see while we're testing, and we'll send you home with both summary report information and our Excel K&C Grapher Tool so you can easily do your own overlays, curve fits, and comparisons as needed.

Example 4: Vehicle Fingerprinting

Client Goal: "We would like to know as much as possible about the suspension on a specific car. We want to know pick-up point locations, stiffnesses, geometry, etc. We have our own geometry software but we need to feed XYZ pickup point locations into it. We are curious how the software predictions compare to actual measurements for things like bump steer & camber, anti-dive, and roll center heights. We also wonder what happens to our geometry when there are tire loads (cornering, braking, etc.) coming through the suspension."

Typical Time: 2 days

Typical Cost: contact Morse Measurements

Test Overview: CMM measurements will map the XYZ locations of all the key suspension and chassis points. These measurements will take about 1 day to complete. Measurements will be summarized into easy-to-read tables for the front and rear suspensions. Another day of K&C testing will reveal actual suspension geometry with and without tire loads. Real time summary reports will provide the information you need.

Example 5: Track Simulation

Client Goal: "We want to test various setups for a specific racetrack. We have some basic data from the track for a baseline setup (things like shock travels, vehicle speeds, and vehicle lateral g's). But we want to know wheel travels, dynamic tire loads, splitter/spoiler heights, and dynamic toe & camber. Can K&C testing help?"

Typical Time: varies...

Typical Cost: varies...

Test Overview: Even though K&C testing isn't "dynamic" testing per se, we can still measure the items of interest. Using our new Track Simulation capability, we can take either on-track measured data or simulation data and play it back through the K&C machine. We'll look at specific segments of the track, such as corner entry, mid-corner, or corner exit. By controlling the forces applied to the car, it will "take a set" in different positions for different suspension setups. With a few spare channels it's easy to measure things like splitter and/or spoiler heights. The tests run pretty fast, so it's really the complexity of part changes on the car that will determine how many setups can be explored in one day. Further, by running tests with and without ground plane forces, you can easily see the effect of compliance (the C in K&C) separately from kinematics (the K in K&C). Our Excel K&C Grapher tool can be used for reviewing the data, and we provide customized summary reports that will report the parameters of interest.