

# Making The Most of Test Days



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Presented by John Rogers

So Why Test?

# But first, why do we race?

- To have fun?
  - Of course, but why do we keep score?
- We want to WIN!



Which guy do you want to be?



# Think where you could be if you find a 1% advantage?

Are you here?

Are you here?

Do you want to be **HERE**?





# Case in point

- A Stock at 2009 Tire Rack Solo Nationals
  - 57 drivers
  - 5% slower finished 41<sup>st</sup>
  - 3% slower finished 21<sup>st</sup>
  - 1% slower finished 3<sup>rd</sup>

# So Why Test?

- Know what is going to happen when you do something
- Know what to do to make something happen
- Learn cause and effect in a safe and controlled environment

# Step 1 - Make A Plan

Decide what you want to test or find out

- Driving skills
- Tire pressures
- Suspension or alignment settings
- Comparing different tires

Focus on the big stuff first



# Step 1 - Make A Plan

Decide how you will judge the results

- What feels good isn't always fast
- What's fast doesn't always feel good
- In racing, winners are decided by who finishes **FIRST**
- Establish a baseline run that will serve as a comparison point

Use the stop watch as your judge and jury

# Step 1 - Make A Plan

- Identify several (not more) primary objectives that must be accomplished during the test
- List several additional test areas to try if time allows
- Don't be afraid to try the un-conventional – you may get unexpected (positive) results!
- You won't know if you don't test

# Eliminate Variables

What is the biggest variable on lap times?

YOU!



# Eliminate Variables

- Autocross
  - Learn the course
    - Settle into a rhythm of repeatable laps to establish your baseline
    - Minimum 6-8 runs, repeatable to within a few 1/10ths
  - Show up early!
    - Run first thing, do your work assignment, then come back and test
  - Evaluate surface changes
    - Is the course cleaning off & getting faster?

# Simulate REAL Conditions

- Autocross
    - Taking multiple runs back to back is lapping, not autocrossing
    - Pause between every run to simulate typical driver spacing
    - Minimum 5 minutes between runs
- If you don't compete on hot tires,  
don't test on hot tires

But remember - this is a test,  
**NOT** a competition

- Don't race your buddy for bragging rights
- Fast practice lap? Pax Index?

Who cares?

Did you learn anything?



# Learning From The Test

Memory is a failing thing

- Record all data
  - Tire pressures - before and after
  - Tire temperatures
  - Lap time with penalties
    - Don't fool yourself into thinking pylons don't count
  - Time of day
  - Ambient conditions

# Learning From The Test

- Record Driver Comments
  - Establish a consistent format for feedback
  - Talk your way around the track
    - Overall feel?
    - Strengths and Weaknesses
    - Changes versus previous setup
    - Identify the key course elements and how the vehicle and you performed in those areas

**MOST IMPORTANT** - separate what the driver did versus what the car is doing

# Learning From The Test

- Focus on the plan now, digest the results later
  - Avoid distractions, but keep an eye open for any need to change direction
- If time permits, try the unexpected, you may get an unexpected result



# Learning From The Test

Most Important - Repeat your baseline set up

- Recalibrates your judgment of changes
- Identifies any change in variables
  - Track getting faster
  - Car or tires getting slower
  - Driver getting tired

Look at the trend to judge the true impact of your changes

# Other Testing Tools

- Action Photos
  - See what's REALLY going on
  - Compare your car to someone else who is going faster
    - How do they do it?!?
    - And what does that look like?

# Other Testing Tools



Front tire is working much harder than the rear tire.

And then there's all that body roll...



# Other Testing Tools



Outside tires are perpendicular to the ground and not rolling over. Car is cornering hard enough to lift both inside tires.

# Other Testing Tools



# Other Testing Tools

- In-Car Video
  - It's not about hero videos on YouTube
  - See how YOU are influencing your racecar's performance



Options  Interactive Mode

scale: 100m

R: RUN\_\_02, 0.00 to 2.58.44

Best	n/a	Sector 1	n/a
theoretical, 46.19	0.00	46.19	0.00
simulated, 39.44	0.00	39.44	0.00
sim delta, 6.75	0.00	6.75	0.00

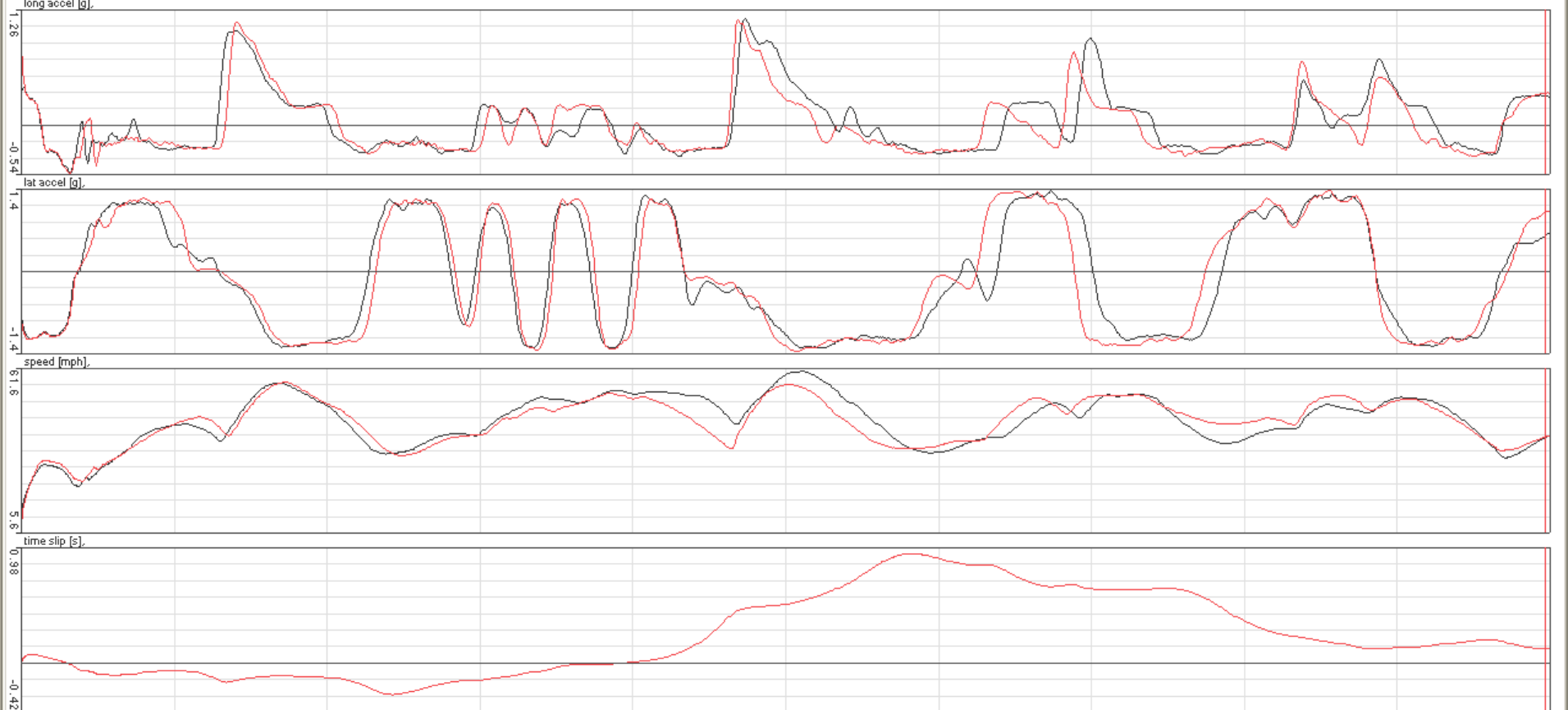
  

Lap times	Sector 1
Run "RUN__02" (46.19)	
<b>Lap 1, 46.19 P</b>	<b>46.19 P</b>
Run "RUN__06" (46.31)	
<b>Lap 1, 46.31</b>	<b>46.31</b>

# Race Technology

Options		
time [s]	133.19	90.81
long accel [g]	0.32148	0.34922
lat accel [g]	0.61953	1.01745
speed [mph]	38.2079	38.4341
distance [ft]	2957.72	2921.54
time slip [s]	0	0.12

Select Variables  Group by variable  Plot against time (not distance)



# Be Careful If You Try To Test During An Event

When was the last time you left an event thinking you got it all?

- Too many variables
  - Steep driver learning curve
  - Surface changes
  - Changing ambient conditions
  - No way to repeat your baseline

# Learning During An Event

- Learn something each time you drive
  - Pay attention to your butt dyno
  - Read the tires - which end of the car is working harder?
    - Work = Wear
    - Wear = Heat
    - Heat = Pressure Gains
  - Make notes after every run or session!
  - Compare what you felt to what you can measure



# Apply What You've Learned At Your Next Event

- Apply changes based on past experiences
- Validate test results in real-world situations
- Experiment
- Keep tuning - you and the car
- Make big changes, don't take baby steps

Test and Learn,  
To Go Faster.



Isaac West