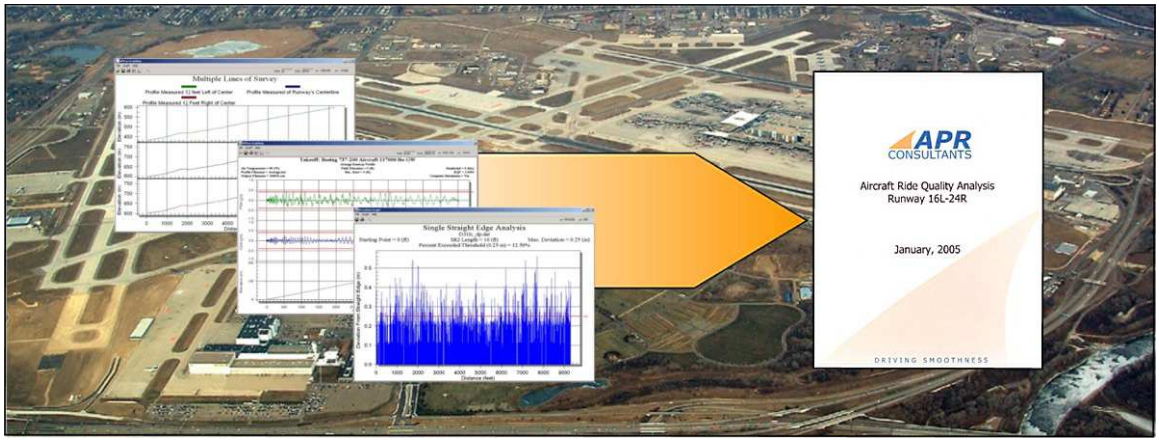
Ride Quality Analysis



Experience Counts…

Profile Analysis. Aircraft Simulation. Straightedge Analysis. These are the standard components of an *Aircraft Ride Quality Analysis* as offered by APR Consultants. Each component is a detailed examination of the pavement's condition from a ride quality perspective. Combined, these elements thoroughly quantify the ride quality of the pavement – from smoothness to roughness.

This process culminates in a detailed written report clearly documenting the results of each analysis; the profile analysis, aircraft simulations, and the straightedge analyses. APR's analysts apply their 30 years of experience evaluating airfield pavements for ride quality, and interpret the data to identify the true ride quality of the measured pavement profile.

APR has an excellent track record of accurately identifying and quantifying areas of roughness. Time and time again, our completed reports clearly communicate the necessary information to our customer so that they can make intelligent decisions about the future of their pavements – saving them time and money.

When it comes to assessing the true ride quality of your airfield pavement, rely on experienced professionals. Experience - it is just another way *APR is Driving Smoothness*.

Profile Measurement

Use the Right Tool for the Right Job…

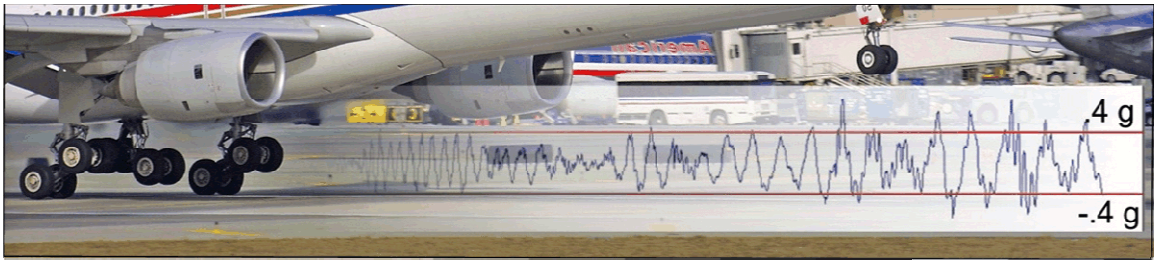
As with any job, there is a right way and a wrong way to get it done. When it comes to measuring your runway's profile, the best way is to measure its *true* profile. True meaning that it is true with respect to sea level. By doing this, all event wavelengths are identified, regardless of length or amplitude. You also capture all grade changes associated with the runway.

"Why am I interested in this" you may ask? Well, let's look at the purpose of a runway. The runway was built to safely and effectively allow aircraft to take off and land – simple enough. But over time, subtle changes in grade, and long wavelength events, be they bumps or dips, can cause an aircraft to respond poorly, thereby putting additional loads on the pavement. These additional loads, over time, will shorten the useful life of the pavement. Therefore, to maximize the useful life of the runway, it is important to identify the longer wavelength events at an early stage before they affect the pavement's life.

Additionally, a true profile can be used for visual comparison years later. The first true profile measurement will establish the baseline profile for that runway. Future profiles of that runway can be compared one to one, and any changes that occur over time will be evident.

Using the right tool for the right job; it's just one more way *APR is driving smoothness*.

Aircraft Simulation



Expect More…

Let's look at the current ways to assess the ride quality of your runway. There are pilot reports, California profilograph, straightedge analysis and the International Roughness Index (IRI). Each one of these methods has weaknesses in delivering the type of information you need about the ride quality of your runway.

The straightedge methods, such as the 16-foot straightedge and the California profilograph are good for assessing a pavement's initial smoothness such as new construction, but due to their limited size, cannot detect all wavelengths that affect aircraft response the most. Response prediction algorithms such as IRI only predict what will occur to a single suspension system; how many inches the strut will travel up and down in response to the pavement's profile. These methods do not take into account the pitch motion that an aircraft will generate in response to pavement roughness. Of all these methods, pilot reports are likely the best. However, by the time pilots begin to complain, damage is already occurring to the pavement and to the aircraft themselves.

The *alternative solution* is aircraft simulation. With simulation you get the same quality of data that pilot reports give you, only you can visually see where the roughness event is on the pavement. What's more, you don't have to have a roughness problem today to benefit from this information. By performing this analysis every three years you can be prepared for roughness by tracking it as it develops, and repairing it before you get pilot complaints, minimizing damage and preserving the airport's reputation.

So, you can spend money on technology that provides you with limited, often irrelevant information, or you can use aircraft simulation, and in return get practical information. Expect more, APR can deliver it. It is just another way that *APR is Driving Smoothness*.

New Pavement Acceptance

APR Consultants, Inc. (APR) has a long tradition of assessing airfield pavements for ride quality and roughness investigation. APR is now expanding our services to provide new pavement acceptance testing and a summary roughness investigation – keeping your project compliant with FAA AC 150/5370-E and FAA AC 150/5380 (Boeing Bump Index). Whether your project services a major international airport or a lower volume municipal / regional airport, this service is value-priced performed by experienced professionals.

Capabilites

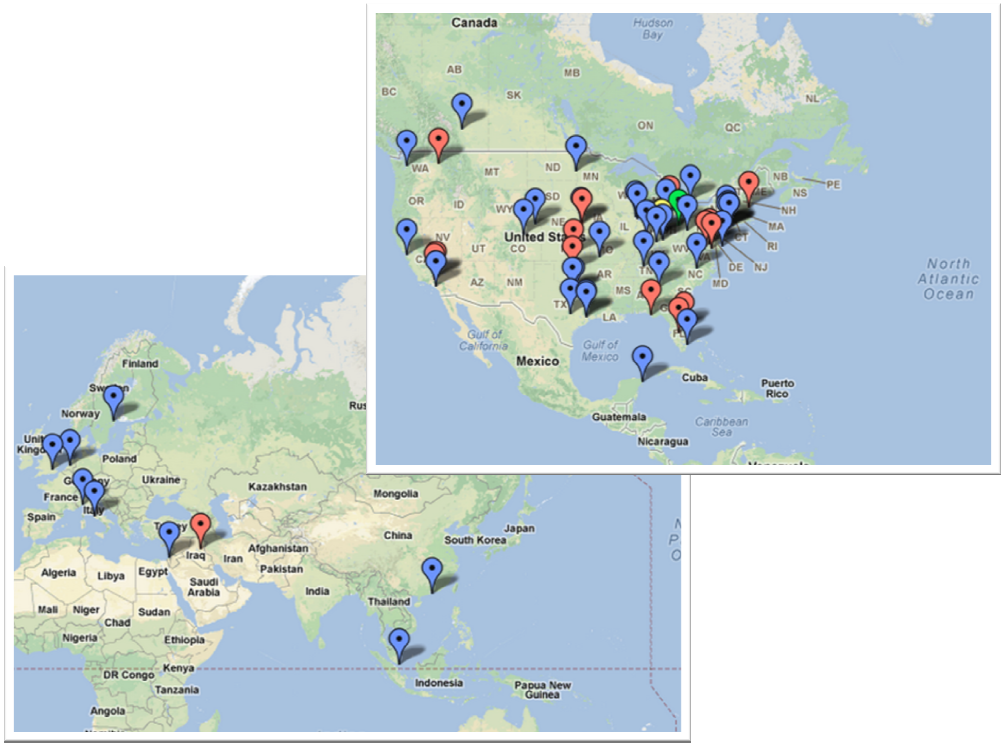
- California Profilograph (Profile Index)
- The International Roughness Index (IRI)
- Rolling Straightedge Analysis (FAA AC 150-5370-10E)
- Boeing Bump Index (FAA AC 150/5380-9)
- Aircraft Simulation

APR's smoothness acceptance testing is unique in that that raw profile data is *measured* instead of using the single-purpose Profilograph or straightedge. True (with respect to mean sea level), raw profile data is considered *flexible* because it can be used for multiple purposes. With flexible data, we can calculate the Profile Index or deviation from a straightedge as called for in existing FAA guidance. Additionally, we can use that measured data to establish a profile baseline of that runway. Airport pavements change over time. Comparing future profiles to the runway's baseline profile is useful for pavement management needs. Even better, APR's service gives pavement owners and contractors acceptance testing and the baseline profile at a rate comparable to single-purpose services charged by many smoothness testing companies.

Please contact us if we can provide you more information on APR's cost-effective services.

How Can We Help You?

- **Enhance Pavement Management:** Aircraft Ride Quality Analyses Performed by APR is a Standard Component of Most of the World's Largest and Busiest Airports.
- **New Pavement Profile Baseline:** True Profile Measurement and Aircraft Simulation are used to *Lock-In* a Baseline for a New Runway. Future Analyses will be compared to this Baseline to Track Changes over Time. APR's Network Analysis Assesses the Smoothness/Ride Quality of Every Pavement in the Network.



APR's Customer Base

- **Design Optimization:** Assess Runway Intersection Designs to Optimize Watershed Performance with Aircraft Ride Quality.
- **Dispute Resolution:** Compare *As-Built* Pavement to *Design* to Investigate Stakeholder Concerns about Construction Quality.

APR *earns* new clients by offering superior services and cutting-edge technology. APR *maintains* existing clients by providing them with concise, accurate and reliable information. APR's first objective is customer satisfaction. It's just another way *APR is Driving Smoothness*.