

Having trouble viewing this email? [Click here](#)

You're receiving this email because of your relationship with Building Science Corporation. Please [confirm](#) your continued interest in receiving email from us.

You may [unsubscribe](#) if you no longer wish to receive our emails.

information consulting bookstore seminars

building science.com e-news

Changing the way the world builds. People. Ideas. Integrity.

July 10, 2009 Issue # 15

Dear Jeffrey,

Taking yourself too seriously is a good way to miss some very obvious lessons that life launches at you.

Joe takes aim at an issue faced by NASA in this month's featured article of buildingscience.com e-news below: *Thermodynamics: It's Not Rocket Science*

BSC's seminar series with John Straube and Joseph Lstiburek is in fully swing. You can hear more from these 2 teachers of building science by attending [one of their fine seminars](#).

To view a list of past newsletters, click [here](#) for our archives.

Happy reading!



Jeff Melvin
Editor, buildingscience.com e-news

[Forward buildingscience.com e-news to a friend!](#)

Featured Article by Joe Lstiburek, Ph.D., P.Eng., Fellow ASHRAE

Thermodynamics: It's Not Rocket Science

Building Science Insight No. 021

Sometimes things are so obvious we miss them. The Second Law of Thermodynamics is like that. Most of us get the heat goes from warm to cold thing.

Of course the crazy way we speak about the Second Law does not help: "In an isolated system, a process can occur only if it increases the total entropy of the system." Huh? It makes you want to hate Rudolf Clausius. Couldn't he just say that heat goes from warm to cold?1 Most of us get the heat goes from warm to cold thing. It's the other simple applications of the Second Law that we miss:

- moisture goes from warm to cold
- moisture goes from more to less²
- air goes from a higher pressure to a lower pressure
- gravity acts down

The two moisture "rules"-"warm to cold" and "more to less" are nothing more than a "thermal gradient" and a "concentration gradient." If you combine the thermal gradient and the concentration gradient you get the "thermodynamic potential" and according to the Second Law water always follows the thermodynamic potential. The psychrometric chart is a graphical representation of "warm to cold" and "more to less"-thank you Willis Carrier.

This "warm to cold" and "more to less" thing should be pretty easy. But seemingly smart folks get it

wrong all the time. Take the Space Shuttle. The problem with the Space Shuttle is that foam keeps coming off of the external tank of the orbiter (Photograph 1). The problem is best described thusly: we have an aluminum pressure vessel filled with a cryogenic liquid on a beach in Florida in July. The best analogy for this is Photograph 2. The author does not have the research budget of NASA so a few liberties were taken with the authors' experimental design defining the problem. [article continues]

To read the entire feature article and find a downloadable PDF version, click [here](#) to visit our web page.

Photograph 1: Space Shuttle-One of the fundamental problems with the Space Shuttle is the shedding of foam from the external tank.



Photograph 2: Engineering Analogy-"Aluminum pressure vessel filled with a cryogenic liquid on a beach in Florida in July."



Upcoming Events in the 2009 Building Science Seminars Series

[Building Science Fundamentals - July 15-16 - Seattle, WA](#)

Building Science Fundamentals is a two-day seminar that teaches the basic knowledge needed to design and build durable, energy efficient, affordable and healthy buildings.

[Designing Low Energy Buildings: Tools, Techniques and Technologies -July 30 - Westford, MA](#)

In this one-day seminar, John Straube will examine challenging techniques for heating, cooling and ventilating low energy buildings, including: natural ventilation, radiant heating and cooling, and passive design approaches for commercial and advanced residential building enclosures.

[Joseph Lstiburek: Figuring Stuff Out -July 31 - Westford, MA](#)

In a one-day seminar, Joseph Lstiburek will provide an entertaining and provocative examination of building investigation approaches based on a lifetime of experience . . . "stuff you don't find in books."

For the complete list of seminars, click [here](#).

Sign Up For This Newsletter!

About BSC

Building Science Corporation is a Boston, MA and Waterloo, Ontario based architecture and building science consulting firm with clients throughout North America.

Building Science Corporation specializes in building technology consulting. Our focus is preventing and resolving problems related to building design, construction and operation.

We are internationally recognized for our expertise in moisture dynamics, indoor air quality, and forensic (building failure) investigations. We are also on the leading edge of the design of sustainable communities and buildings.

We believe in promoting energy efficiency and environmental responsibility within the constraints of marketable and affordable building technology.

Read More About Us: www.buildingscience.com



You are receiving this newsletter either because you have requested it or because of your relationship with Building Science Corporation.

To opt out any time from receiving this newsletter, click on the "unsubscribe" link below. Otherwise, to ensure that you continue to receive this newsletter, please add newsletter@buildingscience.com to your address book now.

Your privacy matters to us.
We are not going to sell, rent, lend or share your information with others.

Copyright © 2009 Building Science Corporation, All rights reserved

You may reproduce this article by including this copyright.

[Forward email](#)

SafeUnsubscribe®

This email was sent to jeff@buildingscience.com by newsletter@buildingscience.com.
[Update Profile/Email Address](#) | Instant removal with [SafeUnsubscribe™](#) | [Privacy Policy](#).

Email Marketing by



Building Science Corporation | 30 Forest St | Somerville | MA | 02143