Tale of a King, a Queen and the Couyons

By
Claudette Hanks Reichel, Ed.D.
Professor, Extension Housing Specialist
Director, LaHouse Resource Center
La Acadienne (Cajun)
Canadians... once removed

(by force)
Laissez les bons temps rouler!

[lay say lay bohn tohn roo lay]

(Let the good times roll!)

Joie de vivre
(joy of living)
Understanding Cajun

*Comment ca va, Grand-mère* = How’s it going, Grandma.
(Come-aw sah vah, grraw-mare)

*Ma cher petite fille!* = My dear little girl!
(Mah sha tee fee!)

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Understanding Cajun

That’s **lagniappe** [lahn yop]
(a little something extra)

But **ça va** [sah vah] for now
(that’s enough)

So, **allons**! [ah lohn]
(let’s go)
Tale of a King, a Queen and the Couyons

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Cooperative Extension Service

• Educational outreach arm of land grant universities
  • Louisiana State University AgCenter
• Mission:
  • Disseminate and foster adoption (*change agent*)
  • Research-based knowledge (*objective, credible info*)
  • Address national and local needs (*issue-based*)
  • To improve quality of life (*public service*)
2000 vision for

To shape the future

for Louisiana living
Sustainable Housing
Permanent, Educational Exhibit

- Building science based demo
- Look & feel like a home +
- Cut-aways, models
- Signage and video tours
- Consumer publications
- Training Center (garage)
- Exhibit room (conditioned attic)
- On-site staff
- Educational attraction
- Meetings, events
## Housing Issues

**National Issues**
- energy costs
- disaster costs
- public health risks
- threatened water supply
- economic vitality
- aging baby-boomers

**Louisiana Challenges**
- hurricanes, floods
- Formosan termites
- mold and decay
- hot, humid climate
- high asthma rate
- pollution, waste disposal
- local economy

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Silos...

Disaster Resilient

Resource-Efficient

Healthy

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What people need is a fusion...

High Performance Home

Healthy

Resilient

Energy-Efficient
Fusion
Blending separate things to create something new and good
Fusion of 5 Criteria = Benefits

- **Resource Efficient**
  - energy efficiency
  - water conservation
  - waste management
  - pollution prevention

- **Healthy**
  - indoor air quality
  - universal design

- **Durable**
  - wind & flood resistance
  - pest resistance
  - decay & mold resistance
  - hail & fire resistance

- **Practical**
  - marketable
  - cost-effective, available

- **Convenient**
  - functional
  - low-maintenance
  - easy
To produce high-performance homes....

Climate, Conditions, & Hazards Matter!
A House is a System

of *dynamic*, interacting systems...

- Thermal Envelope System
- Structural System
- HVAC System
- Moisture Control System
- Plumbing System
- Electrical System
Climate Zones: 2 & 3 – Hot, Humid
From high to extreme rainfall
History of Hurricane Paths
Design Wind Speed Map
Formosan Subterranean Termites
Can cause major damage in 1 year!
These beauties got Joe to say yes!

Formosan Subterranean Termites
Input from many...
Joe came, Joe taught, we learned much – especially about moisture.
Trula’s truth...
Thanks to extensive technical assistance from:

Dr. Joseph Lstiburek, Principal

Dr. Tim Reinhold, Chief Engineer and Sr. VP of Research

Remson Haley Architects, Carroll Mathews, Lemoyne Design, Dr. Mark Levitan, Wooden Creations plus many LSU and other colleagues and industry partners.

and the generous support of:

Entergy Louisiana, Paula Manship, Borate Treated Wood Alliance, La. Home Builders Assoc., Roy Domangue, Roy O Martin Lumber, and 300+ donors.
Timeless, Appealing Design by Local Architects

Blending of the 5 criteria with LSU campus
Showcase of Solutions

- 4 high performance (HP) building systems
- 4 HP foundation systems
- 10 types of windows, doors
- 3 HVAC systems
- 5 attic treatments
- 5 moisture mgnt. systems
- 5 termite protection strategies
- Fortified... for safer living
- DOE Building America
- Energy Star
- Healthy Home / IAQ
- Green Building
- Universal Design
In 2005

Katrina
August 29

Rita
Sept. 24
Impact upon one state

- 1,080 deaths
- 215,000 severely damaged homes
- 515,000 (31%) homes damaged
- 60,300,000 cu. yd. debris
- $100,000,000,000 infrastructure loss
- 81,000 businesses affected
- 18,700 businesses destroyed
- Historic treasure, culture threatened
The work, the time, the cost, the toll.
PEOPLE HANDLE DISASTER IN THEIR OWN WAY, SOME GOOD........
Memorable Holidays
A year after Katrina
Why did it take so long???
Complicating Issues for Rebuilding

Fumbling at all levees
Massive damage levels
Displaced populations
Levee "protection"
Lost revenue
Political turf

Lack of housing = lack of workers
Where's the money?

- FEMA – *temporary housing only*
- Flood insurance – *not enough*
- Homeowners insurance
  - Wind vs. flood disputes...
  - Slow claims
  - Mold exclusion
- Disaster Assistance – *1-2 years later!*

*Too little, too slow!*
Too much, too fast!

- Battles of the plans
- Unlicensed contractors, scammers (*carpetbaggers*)
- Media frenzy
- Confusion, misinformation

Mega Mold

- Conflicting, inappropriate guidelines
- Mold remediers – 31 pricey flavors
- Volunteers, D-I-Y tackling it
By request of The National Trust
DIY guide on one sheet of paper for mass distribution
2015 Edition

- Updated and expanded edition
- For all types of disasters & hazards
  - Mold, lead, asbestos, chemical, etc.
- Comprehensive how-to manual
- For homeowners and volunteers
- *Restore for More than Before*
  resilient restoration section
- FREE online pdf and mobile app

HUD.gov/HealthyHomes

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La. Uniform Construction Code

- Created La. Code Council
- Statewide uniform code
  - Recent IRC as amended by council
  - Local may not amend
- Immediate emergency wind + flood code for coastal parishes
  - Went statewide Jan. 1, 2007
  - Code requirements vary by wind speed map

Enacted Nov. 2005
Base Flood Elevations (BFE)

State Uniform Construction Code:
- IRC uses NFIP standards for flood zones
  - FFE above BFE on flood map A-zone
  - Subfloor above BFE, no stemwalls in V-zone
  - Flood resistant materials below BFE
  - Community may require “freeboard”
- FEMA flood advisories not BFE
  - BUT required for public money
- Based upon 1% probability
  - Assumes repaired levees will hold
Resulting in…

- **Steep learning curve**
  - No prior code in many areas
  - Complexity of wind code
  - Cost of undo-redo

- **Shortage** of code officials, inspectors, housing design pros
  - Few familiar with wind codes
  - 3rd party inspectors scarce
  - Liability issues
  - Permit backlogs, moratoria
  - No $ to train or hire (for 2 years)
In mid-construction @ Katrina/Rita
prime stage to see resilience features
LaHouse LIVE

Merci (thanks) to BMI!
What can I do to help?
King Joe and Queen Claudette
2006 Down da Bayou Tour
(with Tim Reinhold, IBHS)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>8:30</td>
<td>Welcome</td>
<td>Dr. Claudette Reichel</td>
</tr>
<tr>
<td>8:35</td>
<td>Wind</td>
<td>Dr. Tim Reinhold</td>
</tr>
<tr>
<td>9:35</td>
<td>Flood</td>
<td>Dr. Tim Reinhold</td>
</tr>
<tr>
<td>10:45</td>
<td>Rain</td>
<td>Dr. Joseph Lstiburek</td>
</tr>
<tr>
<td>1:00</td>
<td>Air</td>
<td>Dr. Joseph Lstiburek</td>
</tr>
<tr>
<td>2:00</td>
<td>Moisture</td>
<td>Dr. Joseph Lstiburek</td>
</tr>
<tr>
<td>4:40</td>
<td>HVAC</td>
<td>Dr. Joseph Lstiburek</td>
</tr>
</tbody>
</table>

700+ home building professionals
Philantropists and more royalty... with good intentions and $, but...

Founder of *Make it Right* Homes
Don’t do stupid things!
Mais cher, ça c’est couillon!

[may sha, sah say cou-yon]
You decide:  
Ça c’
est bon or Couillion  
(That’s good) (Couyon)  

The *Sinking Ship*  
*Make It Right* house design
You decide: Ça c’est bon or Couiillion

(That’s good) (Couyon)

The Shark Mouth Make It Right house design
You decide: Ça c’est bon or Couillion

(That’s good) (Couyon)

The **Up, Up and Away** flight wings

*Make It Right* house design

© Copyright 2017 LSU AgCenter
You decide:
Ça c’est bon or Couillion
(That’s good) (Couyon)

A Nawlins
Home Again house design
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

The Waterfall Welcome – Rain Catcher

Make It Right house design
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

The For Where There’s No Rain, No Sun, No Wind
Make It Right house design
You decide: Ça c’est bon or Couillion
(That’s good) (Couyon)

New improved & affordable, Nawlins
Make It Right house designs
You decide:

Ça c’est bon or Couillion

(That’s good)                                      (Couyon)

New improved, affordable **Nawlins SIPS**

*Make It Right* house designs
You decide: Ça c’est bon or Couillion (That’s good) (Couyon)

Flood Thy Neighbor
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

subfloor fiberglass insulation
Moisture Flows...
So....

Which way does it flow in La.?

Hot and humid outside
+ Cool, dry A/C inside
Our floors rot and cup in the summer!

- Cool A/C
- Impermeable flooring
- Permeable insulation
- Wet subfloors
- Cupped wood flooring
- Mold and decay fungi
- Termite attraction
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyoon)

subfloor fiberglass insulation + gyp board
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

sealed crawlspace

(in New Orleans)
You decide: Ça c’est bon or Couillion
(That’s good) (Couyon)

sealed crawlspace at Joe’s house
Available at LaHouse Resource Center web site
www.LSUAgCenter.com/LaHouse
Raised Wood Floor Option 1: Sealed, Rigid Foam Panels Under Floor Joists

Airtight, vapor barrier insulation system – protects entire subfloor

- Foil-faced Iso board (fire code)
- Taped seams, sealed edges & penetrations
- Spray foam insulated rim
- Termite shield, capillary break
- Flood vents or open pier & beam

U.S. Environmental Protection Agency’s "Indoor air PLUS" new homes labeling program <www.epa.gov/indoorairplus>, see Technical Guidance-Moisture Control; Illustrations- Dennis Livingston, Community Resources.
Raised Wood Floor Option 2: 
**Closed Cell Spray Foam**

Airtight low-perm insulation system

- Min. 2 in. (R-13 & vapor retarder)
- Inside grade higher than outside
- Plastic ground cover
- If enclosed, coat joists
- Termite shield below wood
You decide: Ça c’est bon or Couillion
(That’s good) (Couyon)
elevated A/C unit
Wind Still Matters!
External Pressures

Internal Pressures
Hurricane Damages

The major building envelope issues:

1. Loss of roof cover
2. Loss of roof sheathing
3. Debris impact – large holes via broken windows and doors
4. Window and door anchorage, connections, and pressure ratings
5. Garage doors & sliding glass doors
6. Water leakage
7. Ridge vents, gable vents and soffits
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

Roof-wall flashing
You decide:

Ça c’est bon or Couïllion

(That’s good) (Couyon)

Stapled roof decking
You decide: Ça c’est bon or Couillion
(That’s good) (Couyon)

French (double swing) doors
You decide:  
Ça c’est bon or Couillon  
(That’s good) (Couyon)  

window replacement
You decide:

Ça c’est bon or Couïllion

(That’s good) (Couyon)

Narrower Garage Return
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

Anchor Bolt Placement
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

Suspended soffit vents
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

home security?
Mais cher, ça c’est bon!

The Wash-N-Wear Houses

Prototype post-Katrina demonstration homes in New Orleans
Prototype *Green Dream* Homes 1 & 2
(Flood-hardy, strong, durable, energy-efficient, healthy, affordable)

- **Flood-hardy** materials and building systems
- **Elevated** on piers to BFE +2
- **Wind connections**, sheathing for 130 mph
- **Termite-resistant** borate-treated lumber, plywood
- **Rain, moisture, air** and **thermal controls**
- **HVAC** for low energy and healthy home
**Flood-hardy!!!**

For homes in *levee-dependent* or *uncertain* flood level areas (potential to flood above BFE)
Wood frame, Flood-Hardy (*drainable, dryable*) Building System
(solid lumber, plywood & closed cell foam insulation)

Courtesy of Building Science Corp.
Elevated, Stable Foundation

- Elevated to BFE + 2 (5 ft. above grade)

- Pier and beam: precast concrete piers on continuous footings
Flood Hardy Materials
solid lumber & plywood – no OSB or LSL in floor and walls
Flood Hardy Materials

GD 1: 2.5” closed cell spray foam in wall cavities – partial fill
GD 2: 2” rigid Iso foam board outside sheathing & wrap
Flood Hardy Materials

GD 1: Fire rated rigid foam under floor joists, taped & sealed
GD 2: Closed cell spray foam between floor joists, rim
Flood Hardy Materials

Paperless drywall w/ moisture resistant core – no mold food
Tile flooring
Fiber cement siding and trim
Hurricane Hardy Roof
Plywood decking, **ring shank nails**, 6 in. spacing
Peel-and-stick membrane – *secondary moisture barrier*
Class H (150-mph) **wind-rated**, Class 4 **hail-rated** shingles
Hip Roof with moderate slope
Aerodynamic + sheds water away + shades all sides

Continuous Sheathing to resist racking
Blocking at seams so all edges nailed to framing
High DP, Impact Rated, Flood-hardy Energy Star Windows and Doors
130 mph wind load connection specs
Continuous Load Path
from roof to foundation
Keep It Dry
Rain and Moisture Management

Wet happens... can it dry???

- Drainage plane AND gap behind wall claddings
- Integrated flashing systems, installed shingle-fashion
- Dry foundation design
- Capillary breaks
- Simple roof design
- High-performance roof underlayment
- Strong, fastened soffits
- Permeable interiors (no vinyl wallpaper)
Keeping the Walls Dry

You’ve heard Joe’s mantra...

**Drain the rain on the WRB**

(formerly known as the *drainage plane*)

Reproduced with permission from Building Science Corporation
GD1 Solution:

Drainage plane AND space

Furring strips over non-perforated housewrap w/ screen wrap insect excluder

Fiber cement siding
GD2 Solution: Drainage Plane AND Space

1. Non-perforated housewrap over plywood sheathing.
2. Insect screen draped over bottom flashing.
3. Foil-faced 2” rigid foam board over housewrap.
4. Furring strips over foam board, screen wrapped over strips.
5. Trim out window well.
6. Fiber cement siding, trim.
Flashing Systems

- Shingle-fashion layering
- Sill + corner protection & drainage
- Interior air seal
Formosan Subterranean Termites can destroy a home in 2 years!

Multiple lines of defense are wise!
Termite IPM
Multiple lines of defense

- Borate treated lumber
  - Pressure-treated or spray-applied
- Treated plywood
- Raised concrete foundation
- Metal termite barriers
- Composite siding
- Moisture control
- Landscape IPM

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Materials That *Last*

- Foundation for expansive soils
- Treated woods
- Corrosion resistant hardware
- Pre-primed fiber cement siding
- 30-year HP roofing (UL Class 4 hail, Class H wind)
- 20-year window glass
- Long-lasting floorings, countertops, factory finish, moisture resistant
- Energy Star equipment with long warranties
High, Dry & Healthy Efficient HVAC

- HVAC in semi-conditioned, unvented attic
- Elevated outdoor unit
- Controlled fresh air supply
  - Clean outside air ducted to AH
  - Filter + flow controller
  - **Positive pressure:** dries building in hot, humid climate
- Spot exhausts
- Dehumidification
If (or when) the levees fail again...

They won’t be homeless, again.
Historic home green restoration:

- drainage mat +
- rigid foam board weather barrier +
- cavity insulation +
  - spray foam is reversible due to rigid foam board
  - use closed cell only for flood-hardy feature
- paperless drywall
Lessons learned?

Problem solved?

Comme ci, comme ça
[so-so, or not too good, not too bad]
Still Number 1
Repetitive Flood Loss State

**FLOOD, LOSS, CLAIM, REPEAT**

Funds paid by the National Flood Insurance Program to rebuild severe repetitive loss properties, 1978-2015

The top states, ranked by number of properties and total damage:

<table>
<thead>
<tr>
<th>Rank/State</th>
<th>Properties</th>
<th>Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Louisiana</td>
<td>7,223</td>
<td>$1.22 billion</td>
</tr>
<tr>
<td>2. Texas</td>
<td>4,889</td>
<td>$960 million</td>
</tr>
<tr>
<td>3. New Jersey</td>
<td>3,246</td>
<td>$660 million</td>
</tr>
<tr>
<td>4. New York</td>
<td>1,802</td>
<td>$400 million</td>
</tr>
<tr>
<td>5. Florida</td>
<td>1,601</td>
<td>$370 million</td>
</tr>
<tr>
<td>6. Missouri</td>
<td>1,526</td>
<td>$190 million</td>
</tr>
</tbody>
</table>

Sources: National Resources Defense Council, National Flood Insurance Program
In 2016
The Great Flood

17–31 inches of rain in 3 days!!!
70% of 140,000+ NOT in flood zone!!!
You decide:

Ça c’est bon or Couillion

(That’s good) (Couyon)

2006 FEMA trailers (RV’s)
You decide: Ça c’est bon or Couillian
(That’s good)                             (Couyon)

2016 FEMA mobile homes
The Great Flood of 2016

Now what about restoring existing homes?
www.LSUAgCenter.com/LaHouse

Flood Recovery Resources

Storm Damage Cleanup Highlights  Wet Floodproofing  Disaster Information  FAQ’s – After Gutting Your Flooded Home

Innovate. Educate. Improve Lives

The LSU AgCenter and the LSU College of Agriculture
FAQ’s: After Gutting Your Flooded Home

1. My home is gutted above the flood level. Now what?
2. Does bleach kill mold? Should I clean with bleach?
3. What should be sprayed in wall cavities, etc.?
4. Does flooding affect my termite treatment?
5. Who should I hire to remediate or apply treatments?
6. So how should mold be removed and prevented?
7. What is “speed drying”? I’m using fans, so why is it taking so long?
8. How do I know when it’s dry enough to restore?
9. Do I need a “clean home certification”?
10. What’s that material between the studs and bricks (or siding)? Is it needed?
11. The studs are dry, but not the sheathing/subfloor. What should I do?
12. Must siding be removed to help exterior sheathing dry?
13. What’s that black plastic/tar paper at the bottom of the wall cavity, between studs and sheathing? What should I do with it?
   - Brick ledge flashing
   - Installed wrong, but still needed
   - Slit to allow drying, then restore

14. What should be done with brick weep holes?
   - Remove mortar mounds
   - Clear weep holes
15. When damaged sheathing is removed (since it’s rotten, soft, won’t dry, mold infested fiberboard, etc.), but there are brick ties…, how can it be replaced?

16. I can’t afford to replace the brick veneer, so now what?

**CC spray foam with rainscreen method:**
- **Rainscreen** strips on brick for drainage
- 2” **closed cell** (cc) spray foam

**Considerations:**
- Provides **weather barrier/drainage plane**
- Adds **structural capacity**, but hard to quantify
- **R13 air-tight insulation** system for energy efficiency
- **Fast**, minimal labor and workmanship
- Can be “**flood-hardy, drainable, dryable wall**”
- **Permit officials** may require 1-inch space
- Will hamper drying
  - So limit to **60% fill**, avoid coating studs
- Need **well-trained installer**
- Expensive
Rigid XPS foam board sheathing method:

- **Restore** brick ledge **flashing**
- **Cut to fit** XPS **rigid foamboard**
- **Insert exterior to flashing** – align with sheathing
  - Maintain **drainage space**
- **Seal** to framing with compatible caulk
- Install **any insulation** (unfaced)

**Considerations:**

- **DIY** method; available & lower cost materials
- **Labor intensive,** time consuming, detail work
- **XPS serves as WRB** (drainage plane)
- **XPS is flood-hardy**
- ½ in. XPS = **R 2.5,** caulk creates air seal (energy-saving)
- **Must use compatible caulk** with XPS
- **Exterior of studs exposed,** so paint or retain sheathing
- **Might need structural reinforcement** (i.e. let-in bracing)
17. Where can I get a “rainscreen” or vent baffle product to maintain drainage space behind brick veneer?

No endorsements, but we found:

- ADO Brand Durovent® polystyrene air channel (cut to fit)
- Advanced Building Products, Inc. Mortairvent® 203 rainscreen
- Benjamin Obdyke Home Slicker® Plus Typar® rainscreen 10 mm
- Brentwood Industries AccuVent® cathedral ceiling vents (16” o.c.)
- Cosella-Dorken Products Inc. Delta-Dry® ventilated rainscreen
- MTI Masonry Technology Inc. 10mm Sure Cavity™ rainscreen drainage plane
- Stuc-o-flex WaterWay® 11 or 19 mm rainscreen and ventilation mat

Check compatibility with cc foam!
Get OK from code official!
18. What kind of insulation should be used…?

Many options for R13:

- **Unfaced batts** installed w/ no voids or compression
- **BIBS** – properly dense packed
- **Dry spray** mineral/glass fiber
- **Damp spray** cellulose with boric acid – min. water
- **Open cell foam**

For flood-hardy, drainable, dryable wall:

- 2.5 - 3 inches XPS (rigid)
- 2 in. closed cell spray foam

19. Should cellulose or cotton insulations be avoided…?

No. Absorbency can increase moisture “buffer capacity”.

20. Does foam cause moisture problems & mold? Don’t walls need to breathe?

Wrong term! Air leaks are NOT good!

We DO need water vapor open (permeable) interior finish.

- In hot, humid climate – walls dry to inside.
21. What caused wood flooring to cup before the flood? How should a raised floor be insulated?

Moisture Flows...

So...

Cold A/C + Urethane Finish (low perm) + Hot, Wet Summer

= strong moisture drive + condensation

= wet subfloor and wet, swollen planks
Available at LaHouse Resource Center web site
www.LSUAgCenter.com/LaHouse

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22. If I can’t elevate, is there any way to avoid so much damage and hassle after another flood?
23. What else should I do or consider during my home’s restoration?
As we shape our homes... we shape our future.

History has shown us...
Open M-F 10:00-4:30
Despite all the Couyons...

**Lache pas la patate!**

(Losh pa la pa tot)

*(Don't let go of the potato – i.e. don't give up!)*

A testament to the enduring spirit of the Cajun people
So the morale of this tale is...

Hindsight is 20/20...

Foresight is Priceless

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Mais cher... L’heure est arrivée
(But dear, the time has come)

Joie de vivre
(joy of living)
Throw me somethin, mista!

Laissez les bons temps rouler!
(Let the good times roll!)