P.O. BOX 7
CUMBERLAND, RHODE ISLAND 02864-000

DECK CONSTRUCTION

A site plan is required showing lot dimensions and setbacks from lot line along with a rendering of the deck to be constructed. All decks must meet the State of Rhode Island, Building Code; if you need to reference the code please contact the Building Official's office to schedule and appointment with either the Building Official or Building Inspector.

The following steps are required for all decks:

1. Deck must be constructed of pressure-treated wood, or equal material.
2. Piers for support must be 40" (forty inches) below grade.
3. Rim joist must be lagged to house.
4. Outside joist must be doubled. Unless floor joists rest directly on a girder.
5. Consult the span chart for the proper size joist provided for you when applying for the building permit.
6. Support posts must be lagged, or bolted to 2 times members.
7. Top of railing must be at least 36" (thirty six inches) and the space between pickets should be less than 4" (four inches).
8. Handrail for stairs must have a cross dimension of no more than 2 1/4" (two and one fourth inches).
9. All joists must have hangers on both ends of joist.
10. Decks shall be located a minimum of 6" (six inches) below threshold.

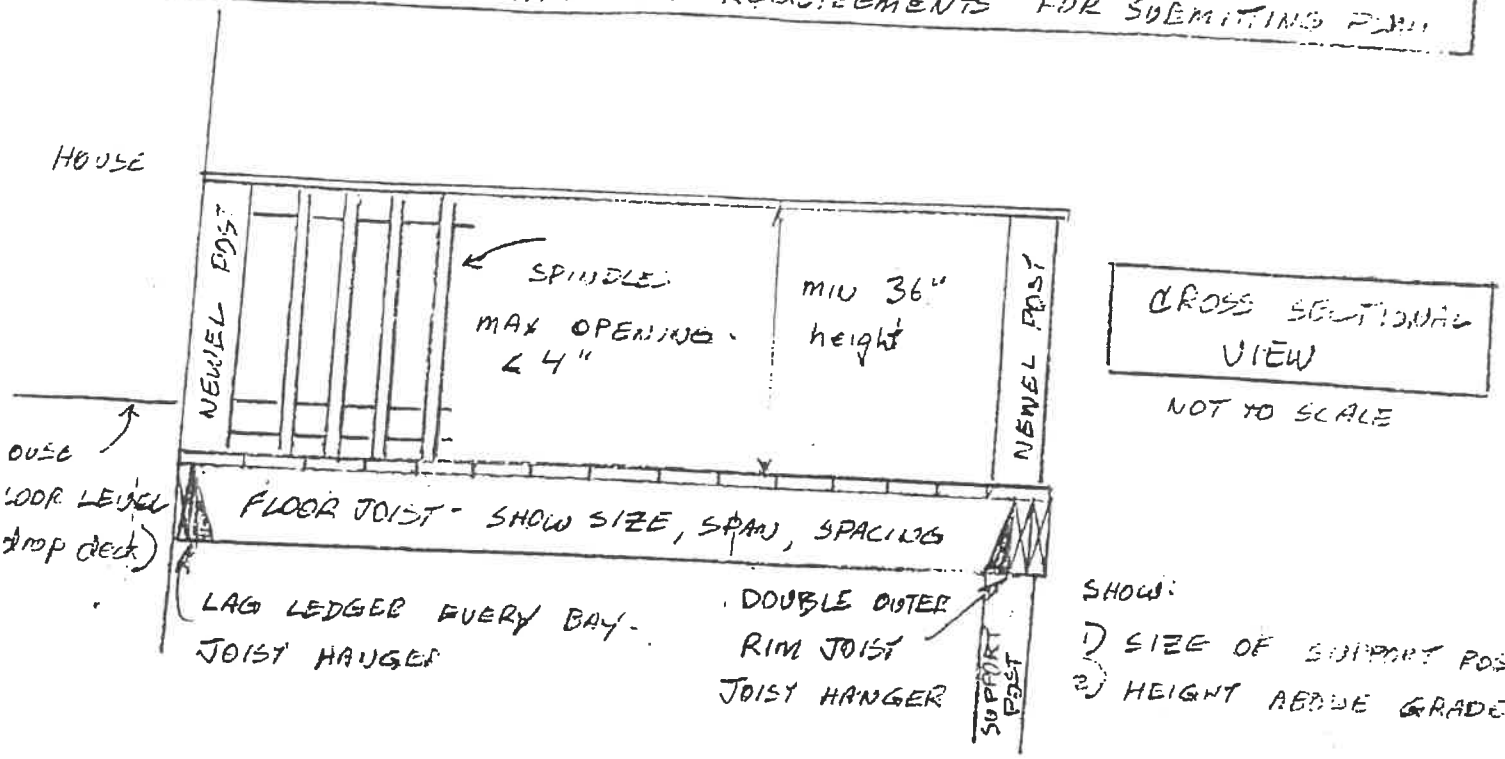
Decks require two inspections:

1. Footings
2. Final Inspection

Town of Cumberland
Building Official
728-2400 ext. 127

Town of Cumberland
Building Inspector
401-728-2400 ext. 144

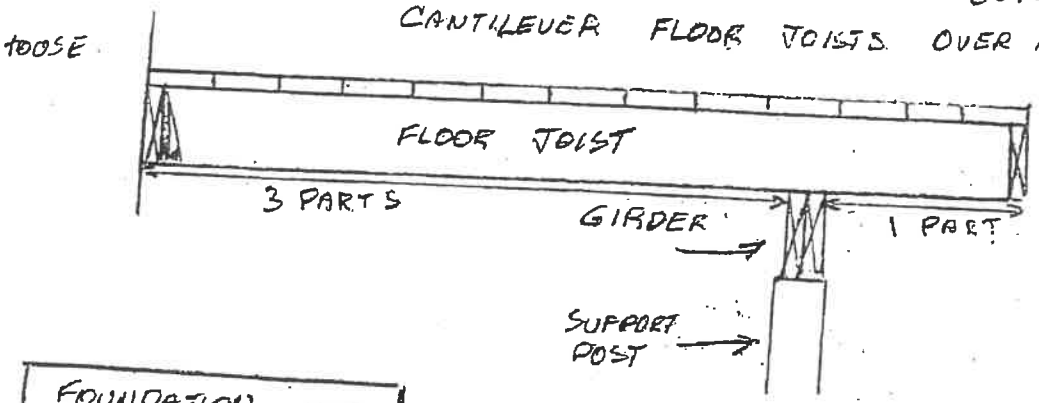
EXAMPLE : DECK ATTACHED TO SINGLE FAMILY HOUSE
MINIMUM REQUIREMENTS FOR SUBMITTING PLAN



CROSS SECTIONAL VIEW
NOT TO SCALE

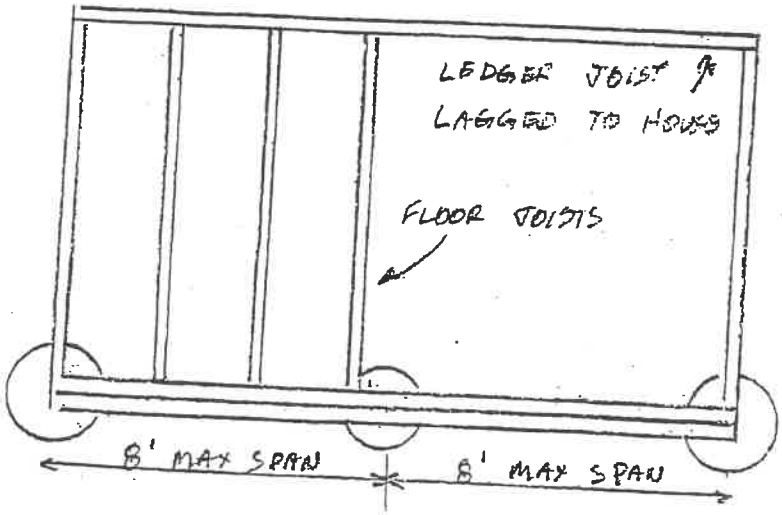
SHOW:
1) SIZE OF SUPPORT POST
2) HEIGHT ABOVE GRADE

ALTERNATIVE : INSTEAD OF USING A DOUBLE OUTER RIM JOIST, CANTILEVER FLOOR JOISTS OVER A GIRDER 3:1

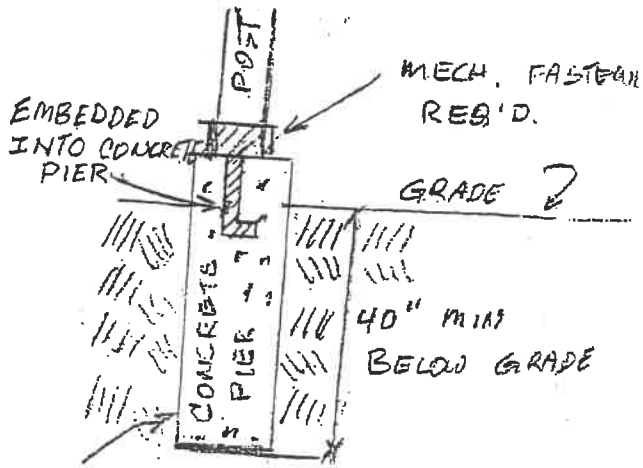


NOTE:
1) USE MECHANICAL FASTENERS TO ATTACH FLOOR JOISTS TO GIRDER AND GIRDER TO SUPPORT POST

FOUNDATION VIEW
NOT TO SCALE



FOUNDATION DETAIL
NOT TO SCALE



TECH NOTE	98-01
EXTERIOR DECK FRAMING APRIL 9, 1998	

The Rhode Island one and two family Dwelling Code requires deck framing to support 60 PSFG (L/360) and also to be of naturally durable or pressure treated wood. The following tables can be used to verify allowable spans for pressure treated lumber, assuming that the lumber is Southern Pine, the most readily available species.

ASSUMED #2 SP

FB	E
2 x 8 = 1725	1.7
2 x 10 = 1495	1.7
2 x 12 = 1440	1.7

ASSUMED #1 SP

FB	E
2 x 8 = 1725	1.7
2 x 10 = 1495	1.7
2 x 12 = 1440	1.7

MAXIMUM ALLOWABLE SPAN
#2 SP PTW

SPACING O/C	JOIST SIZE		
	2 X 8	2 X 10	2 X 12
12 "	12' – 4"	15' – 7"	18' – 2"
16"	11' – 2"	13' – 6"	15' – 9"
24"	9' – 1"	11" – 0"	12' – 10"

MAXIMUM ALLOWABLE SPAN
#1 SP PTW

SPACING O/C	JOIST SIZE		
	2 X 8	2 X 10	2 X 12
12 "	12' – 9"	16' – 2"	19' – 8"
16"	11'- 5"	14' – 6"	17' – 10"
24"	9' – 11"	12' – 1"	14' – 7"

For other species or grades of lumber, call the office of the State Building Commissioner for determination of allowable spans.

Notes:
1 – This table represents substantial reductions in spans from previous Tech Note 85-01 issued January 18, 1985 due to revisions in lumber grading of Fb and E published in 1992
2 – There are three (3) sub grades to No. 1 and No. 2 Southern Pine
No. 1 (2) Dense
No. 1 (2)
No. 1 (2) Non-Dense
These tables are based on mid-grade no. 1 (2).

BOLTING SCHEDULE FOR DECK BANDS

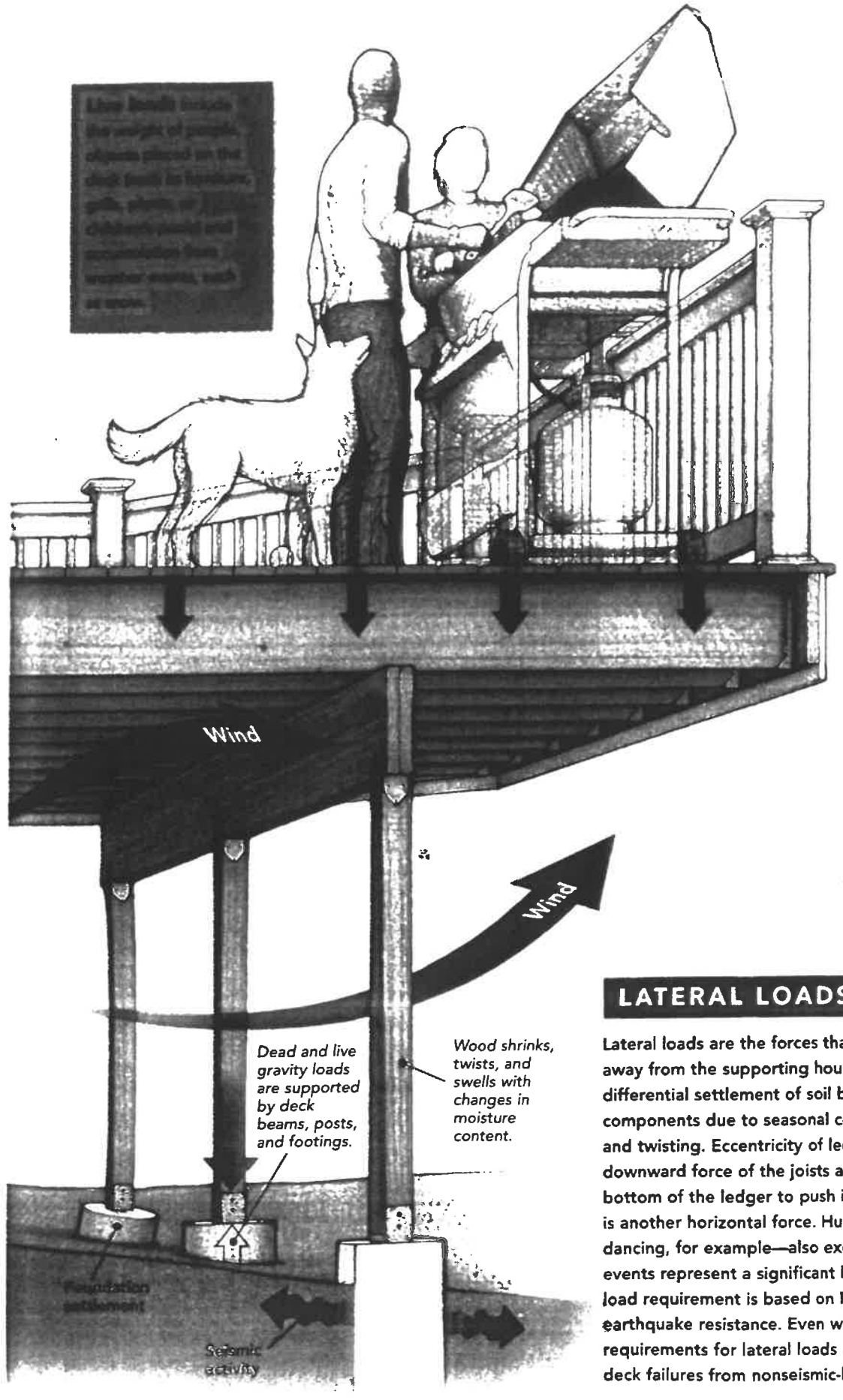
JOIST SPAN	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
BOLT SIZE	1/2"	1/2"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2" 5/8"	1/2"	1/2" 3/4"	5/8"	5/8"
BOLT SPACING	24"	24"	18" 24"	18" 21"	16" 18"	12" 18"	12" 16"	12"	12" 16"	12"	12"
16 D NAIL SPACING	9"	8"	7"	6"	5"	5"	4"	4"	4"	3"	3"

Note:

This table assumes a deck design load of 50 psf (40 psf live load, 10 psf dead load), and Southern Pine 2 – by dimension lumber. As an example, for a deck spanning eight (8) feet, you can use ½ inch bolts on 18-inch centers or 5/8-inch bolts on 24 –centers.

GRAVITY LOADS

Gravity, or vertical, loads fall into two categories: dead loads and live loads. In general, gravity loads are supported by the deck joists, beams, posts, footings, and the connection to the house. When designing a deck, both types need to be considered: The dead load is calculated as the actual weight of the building materials used to construct the deck; the live load must be at or above the minimum design load of 40 lb. per sq. ft. set by the IRC. Higher loads should be used if a hot tub or other heavy items are going to be placed on the deck. One awful deck failure that I investigated occurred during a cookout where friends and family were having a great time cooking, eating, and visiting, while kids played in a little swimming pool on the deck. The whole gang went tumbling down when the poorly constructed connection to the house failed. The primary force at work here was gravity, along with a lateral load component that helped to pull the ledger away from the side of the house.



LATERAL LOADS

Lateral loads are the forces that cause decks to shift horizontally, away from the supporting house framing. These forces include wind, differential settlement of soil below foundations, and changes in wood components due to seasonal conditions, such as swelling, shrinkage, and twisting. Eccentricity of ledger connections—that is, the downward force of the joists against the joist hangers that causes the bottom of the ledger to push into the wall and the top to pull away—is another horizontal force. Human activity on the deck—country line dancing, for example—also exerts lateral forces. In some areas, seismic events represent a significant lateral load; in fact, the IRC's lateral-load requirement is based on FEMA guidelines for improving homes' earthquake resistance. Even where seismic events are rare, the IRC requirements for lateral loads are a good idea and help to prevent deck failures from nonseismic-loading scenarios.

howitworks

THE MECHANICS OF HOME BUILDING

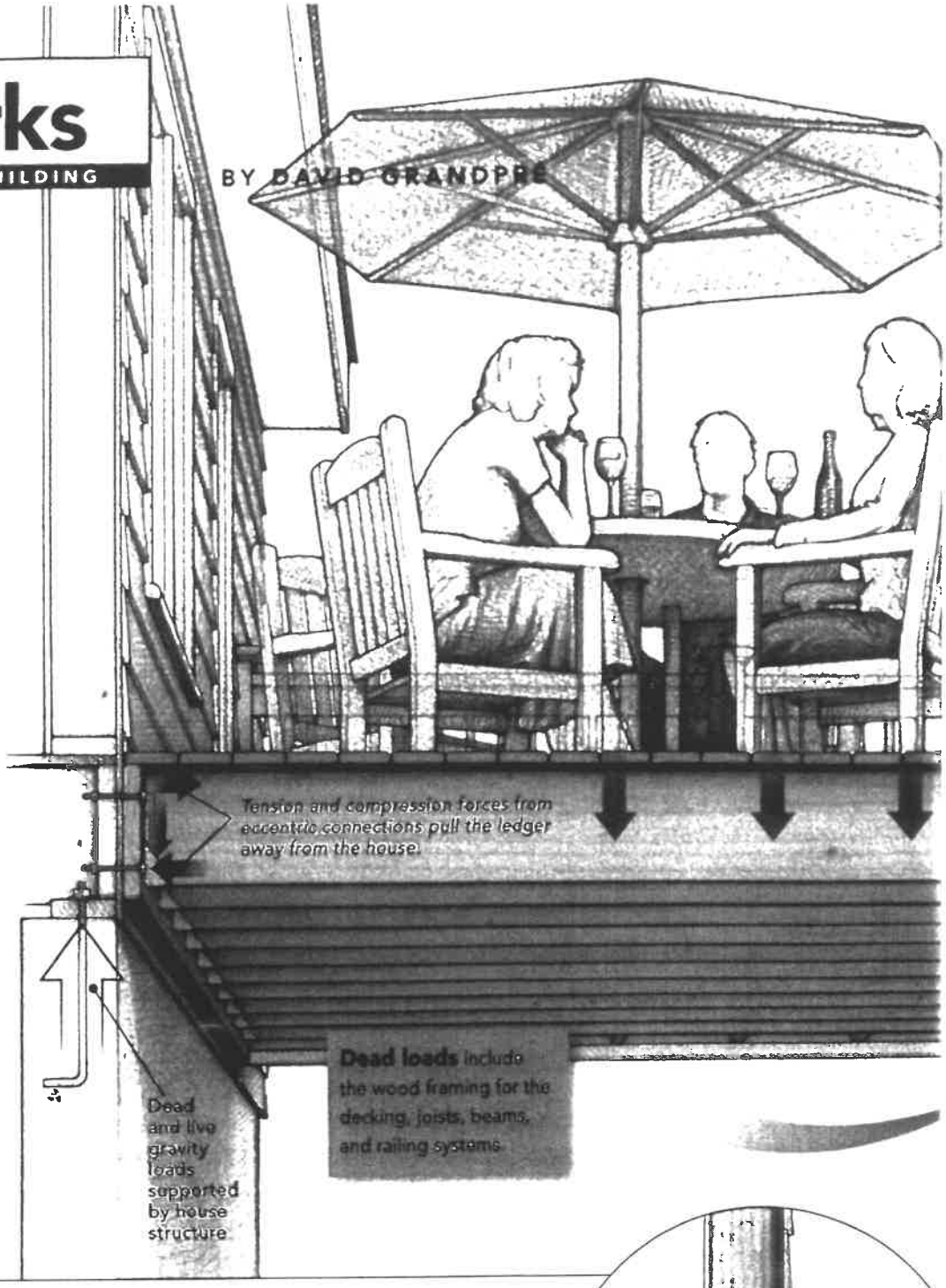
BY DAVID GRANDPRÉ

Deck loads

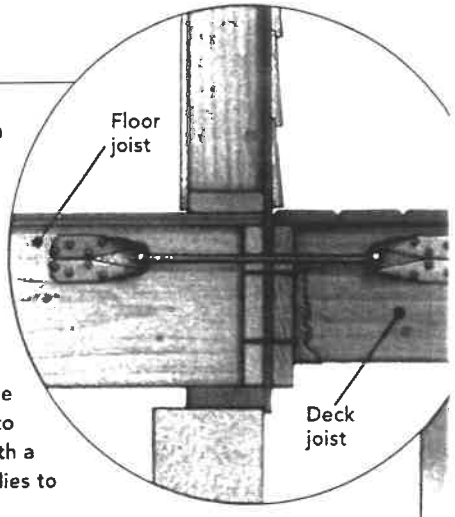
During 20 years of investigating building and building-component failures, I've been involved with a handful of projects where individuals died or were seriously injured. Most of these incidents involved fires and construction accidents. But when you look at those cases in which some component of the structure failed and serious injuries resulted, I'd say poorly constructed residential decks are at the top of the list.

Like any other structure, a wood deck is designed to support applied loads and to transfer those loads to the ground. There are several different types of loads that come into play on a backyard deck, including gravity loads (consisting of live loads and dead loads) and lateral loads. Unless mitigated by proper construction methods, these forces conspire to make a deck collapse. Here's how it works.

David Grandpré, P.E., SECB, is a structural engineer with CA Pretzer Associates in Cranston, R.I. He specializes in investigating damaged buildings.



DECK LOADS AND THE CODE The IRC has taken wood-deck construction seriously and includes prescriptive construction details for supporting gravity loads as well as a prescriptive requirement for lateral loads. Codes applying to ledger attachment are explained further in "Make Any Deck Ledger Secure" on pp. 36-41. While codes governing ledger attachment address gravity forces, in 2009 the IRC introduced a prescribed lateral-load connection detail (drawing right) to prevent a deck from pulling away from the house structure when one side of the deck is supported by the house. This section of the code requires that decks attached to supporting house structures have at least two connections with a minimum lateral-load capacity of 1500 lb. This regulation applies to decks in all jurisdictions where the code has been adopted.



Drawings: Christopher Mill