Termites do not fail a house overnight. They hollow, soften, and nibble strategically, often at the parts we rely on most, like sills, joists, and beams. By the time paint blisters or a baseboard caves under a thumb, the structural system has already been working harder than designed. Good termite structural repair starts with calm measurement and ends with a clear number for every bolt, plate, and sistered member.

I have been called to homes where the visible damage looked minor but the math told another story. In one case, a two inch by eight inch joist looked intact, but the center third had been tunneled so thoroughly that the remaining wood was equivalent to a one inch by eight inch plank. Another time, a sill plate that still held paint, crumbed in my hand and a 3,000 pound shear load was riding on air. The theme is simple, and it is why calculations matter: termites subtract section and compromise connections, so we must add capacity back, precisely.

What makes termite damage different

Typical structural deterioration follows predictable patterns, like rot at edges or checks centered on knots. Termite damage is irregular. Drywood termites tend to stay within one element and leave crisp galleries. Subterraneans enter from below, track along the foundation, and concentrate at sills, rim boards, and moist pockets. Both reduce effective cross section, but they also remove wood at bearing points and around fasteners, which shifts the load path. That is where calculations go beyond a simple “replace with same size.”

Two failure modes often appear together. First, reduced bending capacity because the remaining section is smaller or notched. Second, localized crushing or shear at bearings, where wood perpendicular to grain gets chewed out and can no longer distribute load. For floor joists, you will see sag and creaks. For sills, you will see out-of-level floors, cracked plaster, and sticky doors. For beams and posts, you may find compression ridges and split paint at the top of the post.

Start with the load path and tributary areas

Before measuring any damaged piece, trace the load path from roof to soil. Find where gravity loads collect and where lateral loads transfer. I sketch as I walk: roof planes to rafters, rafters to ridge or bearing walls, down to beams, joists, and then to sills and foundation. For a termite beam repair or termite sill plate repair, tributary width becomes the key number. If a beam carries joists spanning 12 feet on each side, the beam’s tributary width might be 24 feet. With a 12 foot beam span, that beam sees floor live load, floor dead load, possibly some partition load, and sometimes roof or attic storage if framing stacks.

For typical residential floors in the United States, I start with 40 psf live and 10 to 15 psf dead for the assembly. Old plaster and lath can push dead load higher, closer to 15 to 20 psf. If the beam also supports a bearing wall above, I add the line load of that wall: wall weight in pounds per linear foot multiplied by the tributary height of floor above, plus any live load it carries. The point is to get to a clear value for beam reactions at supports and a required bending capacity for the member.

A quick example to ground the math

Say a termite beam repair involves a 4 by 8 nominal built up with two 2 by 8s under a first floor, spanning 10 feet clear, supporting joists on one side only. Joists are 12 feet long, 16 inches on center. Use 40 psf live and 12 psf dead. Tributary width per foot of beam is the joist span, 12 feet. Load per foot of beam is 52 psf times 12 feet, roughly 624 plf. For a 10 foot span, the midspan moment for a simple span is wL^2 divided by 8, so 624 times

100 divided by 8 equals 7,800 pound inches, or 650 pound feet. Compare that to the residual capacity of the existing member. If the termite damage removed 40 percent of the joist bearing notch and 30 percent of the lower third of the beam depth, the section modulus drops faster than linearly because bending depends on the square of depth. That is why an engineer often specifies a steel flitch plate or a larger replacement beam rather than simply doubling up existing plies.

This same approach scales for termite floor joist repair. For a 2 by 10 spanning 14 feet, the uniform load is 52 psf times 1.33 feet tributary width per joist at 16 inches on center, about 69 plf. The moment at midspan is 69 times 196 divided by 8, roughly 1,690 pound feet. If termite galleries reduce the effective depth from 9.25 inches to an equivalent of 7.5 inches, allowable bending stress may still be the same, but the section modulus is now about 7.5 times 1.5 squared over 6, a significant drop. That joint that seemed “a little spongy” is actually overstressed even without anyone walking on it.

What to document before you calculate

You cannot compute what you do not measure. Field notes should capture sizes, species if known, spacing, spans, and what each element supports. Pictures help, but numbers are the soul of the repair. I keep a laser measure, a square, an awl, a bright lamp, and a moisture meter. I also carry a small probing pick. The pick may sound crude, but it is how you learn if the wood fibers are still bonded or if you are pressing into powder.

- Essential field data to collect before a termite structural repair calculation:
- Clear spans, spacing, and bearing lengths for joists, beams, and studs
- Existing member sizes and species or grade stamps if present
- Locations of concentrated loads like stair openings, masonry fireplaces, and heavy tubs
- Shear wall locations, nailing patterns, and anchor types near any sill or rim damage
- Moisture readings and visible extent of galleries at bearings and connections

A moisture reading matters because persistent moisture implies ongoing risk even after treatment. Keep in mind, calculations assume properties of dry lumber. If the sill plate is at 22 percent moisture and crumbly, assume replacement and upgrade connections, not just patching.

Temporary shoring and sequencing keep the math honest

Repair math is clean, but houses carry loads in real time. Before any termite damage restoration on a bearing member, set shoring to take the load safely. Place screw jacks or crib stacks under a temporary header that picks up joists or the wall above. Raise gently, no more than 1/8 inch per day in an older structure, and monitor for cracking or door misalignment. Shoring changes load distribution, so recheck spans. Place shoring posts close to bearing points to shorten the temporary span and reduce bending in your temporary header. When you cut out a sill plate or cripple studs, the transfer plates and jacks must carry the shear as well as gravity. I have seen a fair share of well meaning repairs that replaced a plate cleanly, but forgot to provide a lateral path, leaving a soft story where an earthquake will find it.

Sill plates, rim boards, and the cost of inattention

Termite sill plate repair demands more than sliding a new 2 by 6 beneath a wall. The plate anchors the house to the foundation and starts the shear wall system. If the plate has been eaten for three feet along a perimeter wall, the anchor bolts or straps may be compromised. For calculations, determine the original anchor spacing and type, the required shear capacity for that line of wall based on wind or seismic, and the compression

perpendicular to grain at every stud seat. Modern codes set minimum anchor spans and edge distances. When replacing, you might switch to epoxy set anchor rods with plate washers at 32 inches on center or closer in high seismic regions. Evaluate uplift as well if the locale has strong winds.

Compressing perpendicular to grain shows up here. At each stud, the allowable bearing stress is limited, often in the range of 405 to 625 psi for common species. Termite galleries remove fibers that spread that load, increasing contact stress. You can confirm by simple math: take the axial load in a stud at that point in the building, divide by the area of the remaining plate beneath it. If the value exceeds the allowable, use a thicker plate, add a steel bearing plate, or replace the damaged portion to restore the area.

Joists and subfloor repair, with numbers that stick

For termite subfloor repair, differentiate between skin damage and structural loss. Plywood or http://aa-ndt.com/it-concepts/itconcept_logo/#comment-235304 OSB with minor surface galleries can sometimes be treated and overlaid, but if the face veneers are chewed through, you have lost shear capacity in that diaphragm. For subfloor spans of 16 inches on center, calculate the panel’s bending and deflection based on panel thickness and grade. If deflection under 40 psf live plus dead exceeds L over 360, creaks will return. When I find patches of subfloor termite wood repair, I also check perimeter nailing, because galleries often track along panel edges and you lose the edge nail withdrawal strength. Sister blocking at the panel edges, combined with adhesive and nails or screws at proper spacing, brings that diaphragm back to spec.

For a termite floor joist repair, the simplest valid fix is often a full length sister with equal or higher capacity, bearing fully at each end, not just midspan. The sister must be tight to the existing joist along a long length with adhesive beads and structural screws or bolts spaced to share load. I like to show the total capacity on paper: if the existing joist has 60 percent of its original section left and the sister adds 100 percent of a new joist, the composite capacity is 160 percent of the original single joist, provided the connection shares bending and shear. Screws at 12 inches on center top and bottom flanges, staggered, are common. Check slip, especially under high live load rooms like kitchens.

When a beam needs more than timber

Sometimes a termite beam repair calls for steel, not just wood. A flitch beam, where a steel plate sits between two wood plies, allows you to keep depth and bearing details while significantly increasing bending and stiffness. Run the numbers. For a 1/4 inch steel plate at 8 inches depth, the additional section modulus can be material. Design the bolt pattern so the steel shares load properly, accounting for the different moduli of elasticity. If clearances allow, swapping to a built up LVL may also make sense. LVLs come with known values and uniform quality, which reduces guesswork after unknown damage.

For posts that have been attacked at the base, I often specify a steel post base with uplift and moment capacity, set on fresh epoxy anchors or expansion anchors beyond the eaten area. If the bottom three inches of a 4 by 4 post have turned to lace, cutting back to sound wood and using a steel stand off base returns bearing and isolates from potential moisture. Calculate the combined axial and bending if that post resists lateral load too.

Walls and shear, beyond cosmetic drywall repair after termite treatment

Drywall hides a lot. After termite treatment, many homes need drywall repair. That is cosmetic unless the drywall was part of a tested shear assembly. In older houses, the shear comes from let in bracing, diagonal boards, or

plywood from later remodels. If termites have chewed studs and plates along a shear wall line, your repair must restore that shear path. Calculate lateral loads based on wind or seismic per local requirements, then check the nail patterns, panel thickness, and edge blocking. If the original wall relied on 6d nails at 6 inches on center at panel edges and now the edge is punky, nails will not hold. Replace those studs and plates, add proper blocking, and verify that hold downs meet uplift. I like to draw the load path onto the stud bay during work so the crew sees why we specify certain straps or stud packs.

Termite wall repair also includes considering partition loads. Nonbearing partitions can still add dead load to joists and beams below. If repairs moved a wall or cut out studs during a termite framing repair, add the line load to the nearest support in your calcs, even if you plan to rebuild the wall as nonbearing.

Attic members and what sag tells you

Attics are a favorite for drywood termites. Termite attic wood repair ranges from replacing purlins to reinforcing rafters and collar ties. Numbers help you decide if the wonderful old 2 by 4 rafters can be saved or should be replaced. For a 2 by 4 spanning 10 feet with a steep roof, snow load in northern climates can quickly exceed capacity even with sound lumber. If termites have removed 20 percent of depth at midspan, you will see sag. Check deflection criteria: L over 240 is a common starting point for roofs, but many areas require stiffer assembly for tile or heavy roofing. Sistering rafters in place is possible, but temporary shoring under the ridge spreads forces and keeps you safe while installing sisters or flitch plates.

Connections, the quiet make or break

Termites love the same places where we put nails and bolts because penetrations and joints trap moisture and offer entry. After treatment, do not reinstall with the same nails into eaten wood. Every termite structural repair should include a connection schedule. For joist hangers, examine seat depth, side plate integrity, and nail quality. Replace any hanger with rust or deformed seats. Upsize where calculations say so. If a hanger was marginal even before damage, failing to recalc is asking for squeaks now and cracks later.

Compression perpendicular to grain at bearings deserves repeating. If a termite has chewed a beam notch at a support, the remaining area may crush long before bending yields. Check the reaction at the support, calculate stress as load divided by bearing area, and compare to allowable for the species. Where uncertain on species, use conservative values for Spruce Pine Fir unless grade stamps tell you otherwise.

Species, grades, and why they matter

If you plan to sister or replace, match or exceed the original grade and species. Douglas Fir - Larch No. 2 has higher bending strength than SPF No. 2. Southern Pine also performs well. When I cannot confirm species, I call out LVL or PSL where depth allows because the published values remove guesswork. For exposed work in attics or crawlspaces, borate treated lumber deters future colonies without the corrosivity of some pressure treatments, but verify hardware compatibility and use hot dipped galvanized or stainless fasteners where treatments require it.

Permits, inspections, and coordination with pest control

Structural termite repair is not just carpentry. In most jurisdictions, replacing sills, beams, or significant framing members requires a permit and inspection. Inspectors will ask for calculations when work affects load bearing elements. Coordinate with the termite repair services or pest control company to ensure the structure was treated and the galleries are inactive before you enclose work. Many times, I schedule framing inspections after repair but before insulation and drywall, while leaving small observation ports near previous colonies for a follow up look six months later. This pairs well with termite drywall repair after termite treatment, so you are not patching twice.

A compact workflow that keeps projects on track

- Five step sequence for reliable termite damage repair:
- Treat and verify pest inactivity, then shore and document field data with photos and measurements
- Run calculations for gravity, lateral, and connections, including temporary loads during shoring
- Execute structural repairs first, with inspections at hold points, then restore sheathing and finishes
- Address moisture management and ventilation to reduce recurrence risk
- Schedule follow up checks at 3 to 12 months, and keep calculation notes on file

Real examples and judgment calls

A bungalow with termite damage at the front sill and porch beam looked simple. The porch sagged one inch, and the homeowner asked for a shim. Calculations showed the front half of the living room floor, 12 feet deep by 24 feet wide, was bearing on that beam, roughly 15,000 pounds total including live, dead, and a heavy built in. With commuters stomping in at 7 a.m., that beam saw cycles the shim could not handle. We jacked slowly, cut out 9 feet of eaten sill, set a new borate treated plate with epoxy anchors at 24 inches on center, and installed a built up LVL beam with concealed hangers. The math supported a lighter section than the owner feared, and the finished work vanished behind new fascia. No squeaks. No flex.

In another home, the call was for termite subfloor repair in a bathroom. Probing revealed that only the top veneer was chewed, but the rim joist beneath had galleries at the anchor bolt line. That changed the priority. We designed a new rim segment, spliced with a half lap and two 1/2 inch bolts, reanchored the rim to the foundation with epoxy set rods, then patched the subfloor. Without checking the rim, the bathroom would have looked new but sat on a weak belt line.

Costs and scope, grounded in the math

Clients ask what a typical termite wood repair costs. Range is the only honest answer because hidden damage drives scope. A small termite wall repair, replacing two studs and 3 feet of sill, might run a modest amount for materials and a couple days of labor. A full termite beam repair with shoring, LVLs, and inspections can reach a much higher figure. The calculations keep scope tight. They show where you must strengthen and where you can leave historic members alone. They also help you bid fairly if you are a wood repair contractor for termite damage, since you can quantity take off bolts, straps, and beams rather than pad for unknowns.

If you are searching for termite repair near me or termite damage repair near me, look for a team that includes or partners with a structural engineer. Local termite damage repair often means local framing practices and local load patterns, especially for snow or seismic. A termite damage contractor near me who knows the area’s species, soil conditions, and code will save you time. For major cases, structural termite repair near me should not be a marketing line, it should be a credentialed service that can show stamped calcs upon request.

Moisture, ventilation, and detailing so you do not repeat the job

Termites like what we accidentally supply: moisture, warm voids, and contact with soil. After the structural work, reduce those lures. Crawlspace vents alone do not guarantee dryness. Consider a ground vapor barrier sealed at edges, a small dehumidifier if humidity stays above 60 percent, and proper grading outside. Where you had termite sill plate repair, flash and seal the interface. Keep dirt and mulch below siding by at least 6 to 8 inches. In basements, isolate wood from concrete with sill seal and stand off hardware for posts. Little details like end sealing cut LVLs and painting exposed cuts can deny moisture entry.

Quality checks you can feel underfoot

The test of a good termite damage restoration is not just an inspection sticker, it is the way a room feels and sounds. Floors should be quiet. Doors should swing true. The line of light under a baseboard should be straight. If your calculations were tight, deflection will be within limits and footfall will feel solid. I always walk the room with the owner. We pick a spot that used to bounce, then both stand and shift weight. If the repair involved termite floor joist repair with sisters and blocking, that moment is when the math shows up as confidence.

A few final cautions born from field mistakes

Do not splice sisters short of a support unless you have designed a lap that can transfer moment and shear. Do not rely on nails in eaten wood to carry your loads. Do not assume a cosmetic patch, like termite drywall repair after termite treatment, means structural members behind it are sound. And do not forget lateral loads while focused on gravity. The earthquake or wind event does not care that your repair looks neat.

Termite structural repair is as much judgment as it is arithmetic. Good numbers guide that judgment. If a joist is marginal by 10 percent, I might still ask for a sister if the room above is a kitchen filled with stone countertops. If a beam checks out for bending but fails bearing by a small margin, a steel bearing plate at the post might solve the problem more elegantly than a deeper beam. That kind of decision making is what separates a patch from a restoration.

With the right measurements, clear calculations, and craft on site, you can repair termite damage to a house so it not only passes inspection but performs quietly for decades. Whether you are a homeowner coordinating termite repair services or a carpenter doing termite framing repair, lead with the math, then build to it.