Keeping Your Guitar Safe From Mother Nature

by Marshall Newman

It happens like clockwork in summer and again in winter: a parade of guitars with cracked tops, lifting bridges, loose braces, buzzing strings, sharp fret ends, curling pickguards and other assorted ills arriving at guitar shops across the country. The cause of these ills may be Mother Nature, primarily heat and humidity or a lack thereof, but the fault lies with owners who fail to recognize potential dangers and protect their instruments.

To appreciate the potential dangers, consider the elements that make quality guitars like those from C. F. Martin so vulnerable. The body is constructed with wood only 1/10th of an inch – or less – thick. The body, neck, bridge and braces are held together with glues that maintain adhesion at normal temperatures, but release with the application of high heat to facilitate neck resets and repairs. The finish on a guitar – whether glossy or flat – is often less than 1/100th of an inch thick, yet hard enough to protect the wood. Add steel strings with tension of between 150 and 200 pounds pulling on the bridge and the top, and it is clear these are instruments created to make music, but not to withstand extreme conditions.

Heat we all understand. Humidity – on the other hand – is somewhat mysterious. Humidity is the ambient moisture in the air and is measured as relative humidity, a percentage of the maximum humidity air can hold at a particular temperature. All other factors being equal, as temperature rises, relative humidity drops.

Wood is porous and thus humidity-sensitive; it seeks humidity equilibrium with the surrounding environment. Held firmly in place by glue joints at the sides, the top and – to a lesser extent – the back of an acoustic guitar will contract (“sink”) or expand (“belly”) as relative humidity falls or rises.

C. F. Martin guitars are built in a carefully controlled environment with temperature between 68° and 72°F, and relative humidity between 45 and 50%. Both of these ranges are considered ideal for premium guitars, both in building and in general use. While ideal is – well – ideal, most guitars can handle relative humidity between approximately 40 to 60% and temperature between approximately 35° to 95°F without much problem. However, leave a guitar in an environment that exceeds either of those ranges and damage becomes a real possibility.

At 40% relative humidity, players may begin to notice protruding fret ends, caused by contraction of the fingerboard. At 35% relative humidity, the top begins to sink, strings may start to buzz, and the soundboard begins to look and feel “rippled” like corduroy. At 30% humidity and below, top sinking becomes pronounced and soundboard cracks become likely; fretboard and bridge cracks also are possible.

Excessive relative humidity causes different problems. Relative humidity over 60% may cause the top to belly, resulting in very high action. Over time, it also can loosen the bridge and top braces, tarnish frets and strings, corrode tuning machines and cause mold to grow.

Excessive heat can be equally destructive. A loose bridge or loose brace can occur when the glue holding them literally melts; sometimes even the neck joint pulls loose. The pickguard can curl as the glue melts and the plastic shrinks. Excessive heat often is accompanied by low relative humidity, resulting in damage from both.

Structurally, guitars handle excessive cold fairly well. However, guitar finishes – especially a nitrocellulose lacquer finish – can be damaged by rapid temperature change from sub-freezing to room temperature or (more rarely) vice versa. The finish gets fine cracks called “checks,” in much the same way that a chilled glass will crack if hot water is poured into it.

Why are summers and winters so perilous for guitars? Because they are when guitars encounter the greatest extremes and most precipitous changes in heat and relative humidity. In late spring and early summer, guitars frequently get left in car trunks, where sunshine can quickly bring the temperature up to 140°F and relative humidity down into the teens, more than enough to crack tops and melt glue. In late autumn and early winter, the house furnace kicks on, relative humidity drops precipitously, and guitars hanging on walls and sitting on stands can get very dry in a hurry.

Some locations in the United States also are perilous. The Southwest, Great Basin and Great Plains regions are extraordinarily dry much of the year. The Gulf Coast, Southeast and Great Lakes are very humid from spring through autumn. The Northeast is quite humid in summer and the Northwest similarly so from autumn through spring. Surprisingly, Alaska is unusually humid throughout the year.

For all of Mother Nature’s potential to wreak havoc on guitars, protecting them from harm is relatively easy. Begin by knowing the temperature/humidity in your home. The local newspaper usually publishes local conditions and the National Weather Service offers them online, but to accurately know the relative humidity and temperature in the room where guitars are kept, buy a hydrometer.
thermometer, calibrate it for accuracy, and track the numbers.

Keep guitars in their cases when not playing them. Hard cases provide protection from more than hard knocks – they provide a seal against the room environment and a smaller area in which to control relative humidity. In-case humidifiers can maintain cased guitars at ideal relative humidity, but should be closely monitored to make sure they don’t go dry, don’t leak and don’t leave rubber or plastic residue on the wood. Also, avoid storing them in locations prone to extremes and/or rapid changes in temperature and relative humidity, such as adjacent to heater vents (forced air heating is the worst), along outside walls, in hot attics, in prolonged direct sunlight near a window, and in garages or basements.

Traveling by car with a guitar in the trunk may be unavoidable, but can potentially be disastrous for the guitar, especially on hot days. Heat risks can be moderated somewhat by putting the case in an insulated case cover or by wrapping the case in a blanket. That said, never, NEVER leave a guitar in the trunk after arrival; heat builds up quickly in a parked car. Also, if a guitar has been transported in a car trunk in below-freezing weather, bring it into the house and wait a few hours while it warms before opening the case, so to avoid causing finish crazing.

Last, but not least, be vigilant for signs of trouble. If a guitar’s fret ends begin to protrude, if its action begins to feel high or strings begin to buzz, if the top begins to get a rippled look and feel, if a crack begins to form, don’t hesitate – get your guitar to the repair shop immediately. All it may need is rehydration and/or minor adjustment, but taking action early can prevent major damage later and enable you to deal with the cause.

Be good to your Martin guitar and it will be good to you.

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Suite Judy Blue Eyes

This beautiful 1930 00-40H (Serial #45266) belonged to Stephen Stills. In fact, he used it to write and record his legendary CSN song Suite Judy Blue Eyes that appeared on their first album release. The song’s tuning is a bit unusual – all E strings except for one B – EEEEBE. The “Suite,” composed in four parts, was written about Stephen’s relationship with Judy Collins, and he eventually presented it to her after their breakup as a special memento. All things age, and so has this guitar – most likely the result of very dry humidity and forced hot heat in the cold New York City winters. But the cracks are all reglued now and the guitar sounds as clean and clear (if not more so) than the day it left Nazareth. Judy has agreed to loan the very special piece of musical history to the Martin Museum for display.