Sunday Pictorial

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● An Aircraft Company Decides To Build A Better Guitar

● Glen Campbell: Minstrel Of The New Country Music

Glen Campbell with his Ovation guitar built by Kaman Aircraft.

Company Decides To Build A Better Guitar

by Robert Holland



could begin testing other guitars and the materials they were made from, as well as new materials, trying to learn about vibration characteristics.

"We had run into some trouble at one time with our helicopter blades in the far east," Kaman said, "the weather there is abusive to any kind of material and our blades were made of spruce. We had to develop a way to protect the blades, but which would also stand up under vibration. We came up with a fiberglass material—in the guitars we call it Lyrachord—which really is a sophisticated laminate. We decided to try it for use in making a guitar body."

But here, again, it was Martin they had to beat. "We had developed a test which didn't lie to us about sound. If you ask someone how a guitar sounds they'll tell you it's sweet or mellow.

"That machine we made doesn't know how to spell sweet, it just responds to the vibrations coming from the instrument."

One of the first guitars they built was an exact replica in size and framing of the Martin D-28, except that the back and sides were made of fiberglass instead of rosewood. Jim Richard, a design engineer at Kaman's Ovation plant on the banks of the Farmington River in New Hartford, showed me the replica during a recent visit there. He explained that when tested on their audio oscillator, it did not come up to Martin's version.

"But with fiberglass," Rickard said, "we were not limited by shape and that was when we decided to try a rounded shape, figuring it would give us better projection of the sound." They went to a slightly rounded back with straight sides and finally when that shape didn't produce the sound they wanted, to the fully rounded back and sides.

As the whole project began to move from the sedate calm of Sunday morning coffee sessions and the market studies indicated that a full scale venture into the music business might be a profitable move for the company, Kaman started looking around for the right kind of people to run the operation. He found one of them in Chicago at the 1966 World Trade Show.

Jim D. Gurley is a former entertainer, a handsome westerner with a soft panhandle accent and a vocabulary that would make any marketing man drool. Behind the phrases and buzz words he's a country boy who likes to talk and sing with one of those Ovation Roundbacks slung over his knee, just like any other guitar picker with a country music background. He is general manager of the Ovation Division.

"I was in Chicago at the show," he said, "when this big, tall New England type walked up, stuck out his hand and said, 'Hi, I'm Charlie Kaman. I live up in Connecticut and make helicopters."

Gurley was with Ampeg then and had himself designed several new guitars himself, but the company wasn't interested. "Charlie (Kaman) began to outline his ideas, describing a high quality, acoustic guitar and I just got more enthusiastic as he talked." What hit Gurley hardest, though, was the roundback idea and the theory of its being a miniature bandshell, designed to project all the sound the instrument produced back out through the sound hole.

"It was kind of funny," Gurley said, "but when he described the round back idea, I remembered one time when I was in this town in Mexico. I was walking across the street when way up at the other end of town I heard this band playing and the sound of the bass carried over the other instruments. I walked down to where they were playing and discovered that the guy who was playing the bass had this big, roundbacked instrument that was just booming out sound."

Gurley hardly hesitated. "My friends told me I was crazy," he said, "they kept asking what helicopter makers knew about guitars. Well, I told them that they knew a lot about vibration and they ought to be able to use that for building guitars."

He turned out to be more right than he'd expected. The round body made of two sheets of fiberglass cloth, injected with epoxy and moulded in a huge press, proved to have nearly ideal vibration characteristics. The material is thin and hard, meaning it vibrates evenly and consistantly. It is also strong, completely scratch proof and virtually indestructable. Moreover, because every guitar is moulded exactly the same, there is almost no variation between individual instruments.

However, most of the other materials which go into the Ovation Roundbacks are the same as those you would find in any high quality acoustic guitar; straight-grained spruce for the top, mahogany and maple laminated together for the neck, ebony for the fingerboard and rosewood for the bridge and the facing on the peghead. But though the materials are traditional, the method of fastening them together is strictly a product of the space age.

Kaman Corporation has had a good deal of experience in bonding materials and, the fact is, that's the way you make guitars... you glue them together. The usual way is to apply the glue and leave the pieces held together in a specially constructed vise until the glue sets, sometimes taking two to three days. But using up-to-date adhesives and electronic equipment, the tops can be turned out with inside braces glued and set within minutes. What's more, the adhesives are so tough that the wood will give way before the glue does. The gluing techniques and the hard body are a couple of reasons why Kaman offers a lifetime guarantee.

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Jim Rickard, one of Ovation's design engineers, sights across the body of a guitar still in process. On the bench are the two experimental shapes they tried. The first try is on the right.

Photos by Ted Eastwood

An Aircraft

Ernest Hemingway once told a young writer that only by reading would he know who he had to beat. Probably that same advice can be applied to anything, and it was the tack Kaman Aviation Corporation took when they decided to build a better guitar. They had to know who the competition was, how good their product was and finally . . . how to beat them.

The competition in the guitar market, at least in acoustic guitars, that is flat-top, round-hole, non-electric guitars, is C.F. Martin and Company of Nazareth, Pennsylvania, and according to Charles Kaman, founder and president of Kaman, that was the only competition.

Kaman, who is a well-known inventor and innovator, was the force behind the unorthodox corporate step from aerospace to guitars, a step which was only possible because of his background. Tall, lean and angular he has a quick friendly smile, but along with it you are aware of the way he questions and weighs with his eyes.

"The guitar has always been a personal thing with me," he said, "I've played it since I was a kid." He sat in a gold upholstered chair surrounded by the efficient dignity of his office on the second floor of the corporation offices in Bloomfield.

"No one had used any of the new materials for musical instruments," he said, "and at that time, back a few years ago, we were looking for ways to diversify. It was sort of an interesting challenge. We began by visiting the companies who made the best guitars and were appalled at their methods and the waste of time." Most of the work is done by hand and that kind of labor is the most costly. "It meant we had to find new ways," Kaman said.

The challenge of finding new ways to build a better guitar and of applying new materials were reserved for Sunday mornings in a corner of the helicopter plant. Here, with uninterrupted time, they

GUITAR, CONT'd





Charles H. Kaman (right) and Jim D. Gurley, a general manager with a country lilt (far right).

Carefully, one of the fiberglass guitars is buffed and rubbed to a glossy finish.



But there are other problems with lifetime guarantees, especially in the guitar business. "Most of the other companies spend too much time straightening warped necks and repairing cracked and split tops," Kaman said. "We have made some changes which help to eliminate spending costly time on repairs while not hurting the sound of the instrument." The first of these, using a tension rod in the neck to take out a warp is not particularly new. The second change is unique to the industry. The Ovation's are built with a thin strip of fiberglass cloth laid across the inside of the top so that the grain in the cloth runs in the same direction as the grain in the wood and therefore does not interfere with the vibration characteristics of the spruce.

The drive to find new ways, ways that were better and more economical, turned up several changes. The rosette which circles the sound hole—called purfling—is actually a photograph laminated between two pieces of mylar plastic. Normally the purfling is inlaid by hand, often in tiny pieces, and requires a great deal of time. In manufacturing, the name of the game is time and the more you can reduce the time spent in any given operation, the more money you can save. Of course if the final product does not meet the quality standards you have established then the time saving is lost. No loss here for Ovation...you can't tell the difference in the finished product from a hand inlay job.

But even with all the new machines and the sound testing, even with the new gluing techniques there was one thing they could not with any certainty predict. That thing is balance and even though the charts they had made on their oscilloscope showed that the Ovation had good balance, the decision still had to be made by a musician. According to Kaman, they did "a little empirical fooling around" and each time tested the results. Until now only Martin had achieved any real balance and they've been at it since the early 1800's. The graph sheets made from the sound tests showed clearly that the Ovation performs better than the Martin in the lower and upper ranges, but that Martin is slightly better in the mid ranges.

Forget about the machine...just listen. The Ovation is sharp, and clear, each note well defined and the sound is big, carrying easily even under the most difficult circumstances. Maybe it is even a little too good. The rounded back is so efficient at projecting the sound out from the guitar, that the guitarist may find it a little difficult to hear his own guitar. In fact if you hold the guitar at arm's length, strum it, then turn it away from you, it is just like someone closed the door. Across the room however, every note is clear and sharp.

The only problem with the Ovations is their actions, that is the distance between the strings and the fingerboard. Generally the action is high. Gurley explained that they make them that way because of shipping conditions. "Most guitarists will take it in and have a man adjust the action the way they want it," he explained. The ivory plate in the bridge is not glued and can be taken out and the bottom filed, thus effectively lowering the strings.

Okay, so you build a guitar, a good guitar, one which competes with the best in the business on its own ground. But to do it, you had to violate tradition and tradition is a strange thing among musicians and has to be reckoned with. "I once saw a guy playing this big, triangular thing of a guitar," Gurley said. "That was, I think, an example of violating tradition for the purpose of being sensational. We violated tradition for a reason, to build a better guitar."

Even so, whether the violation was justified or not, they had to take their unusual looking guitar and sell it. "We encountered a lot of skepticism," Gurley said, "and a lot of people told us a plastic guitar would never sell. We had to get people to play the instrument."

Kaman explains it this way. "We finally got Glen Campbell to play one, to just sit down and give it a try. He was amazed at how the guitar responded." Campbell plays nothing else now, using the Ovation instruments exclusively on his show and in personal appearances.

And then there's Josh White who was on hand to advise them even as they were trying out their new ideas and ways, and stayed with them through the development. Ovation named one of their guitars for him. "I think we're winning," Gurley said, "in fact I just got this today." He opened a file folder on his desk. "It came in marked special because the guy who ordered it is Bobby Darin."

Darin bought his, but one of the problems with making guitars, it turns out, is that everybody and his cousin tries to get one out of you for free. Gurley is deluged by groups who have just cut their first album, asking that Ovation supply them with free instruments. "We have one answer," Gurley said, "no."

Ovation, however, does not build just acoustic guitars. They make a whole line of electrics and amplifiers into which they have poured years of electronics know-how. In their amplifiers, for example, if one part should fail during a performance, say the reverberation unit, the musician simply opens the back of the amplifier and pulls out the printed circuit card which controls that section. The rest of the amplifier is unaffected.

The revolution, though, was in acoustic guitars, not electrics. "Actually what we did," Kaman said, "was crank aircraft technology into building musical instruments. What we wound up doing, was using modern materials to build a less expensive, quality guitar. Our prices are up now, but we expect to hold them as the others go by us." That's already begun, and of the four big names in acoustic guitars, Martin, Ovation, Gibson and Guild, the Ovation is the least expensive in the deluxe range. Their cheapest guitar sells for $299.50. The most expensive is the Glen Campbell model twelve string at a whopping $599.50.

The prices seem to be the least of their worries though, because the guitars are selling well. The biggest success has been out west, but things are looking up in the east now, too. Guitars and mouse traps, it seems have a lot in common and as Emerson one pointed out...it's only a matter of building a better one. In the guitar business it's been roughly 400 years since anyone has done that. □ □ □