

We have had several inquiries asking us about CAIO Coaches since we published an article on them in the February, 2013 issue of NATIONAL BUS TRADER. Hence, we will take this opportunity to try to answer the questions and walk our readers through the interesting story behind CAIO coaches in the United States.

One reason for these questions is that the CAIO Coaches coming to the United States represent a different approach to the motor-coach market. They represent a new take on a tried-and-true production procedure known and accepted in Europe and elsewhere but virtually unknown in the United States. With these differences, there are numerous commercial coach operators who may find that CAIO coaches fill an obvious gap in their fleet.

Perhaps the best place to start is with the often-asked question: "What is the best bus?" The answer is that the best bus for your business depends on your application. If you tell me that you want to run a coach at least 500 miles every day in heavy scheduled line-run service, I will recommend one or more appropriate models. However, if you tell me that you only need to move 25 people from a hotel to a nearby convention center in the morning and return in the afternoon, I will recommend a completely different type of vehicle, likely a mini-bus. One size or type of bus does not fit all in our industry.

A challenge for the average operator is to find a bus with the specifications and price that fits their business. However, one must also keep in mind that longevity and quality are two separate aspects of a bus. Just because a bus is not designed to last 40 years does not mean you can not get the same quality, fit and finish.

A Gap In The Marketplace

Here in the United States and Canada, our intercity coach design has been heavily influenced by a need for longevity and for heavy scheduled line service. GM coaches were obviously built with high durability. Some of the Scenicruisers ran more than three million miles for Greyhound before they were sold to other companies. Harry Zoltok designed coaches to run long distances in the worst of Canadian winters. Our native U.S. and Canadian intercity coaches last longer than any in the world – and are also by far the most expensive. In fact, over the last 10 years the average purchase price of a new motorcoach has jumped more than 41 percent from approximately \$340,000 in the year 2000 to \$480,000 in 2009, according to the ABA. They are much higher priced in today's marketplace, four years past.

On the opposite end of the scale, we also have a wide variety of body-on-chassis buses that offer an attractive economical purchase price but do not have the longevity or ameni-

CAIO Coaches Filling an Important Gap in the Coach Market



Article and photos courtesy of Larry Plachno

This CAIO coach was photographed on the assembly line at Botucatu. The frame structure is complete and it will now receive the final components, the interior and glass. Note the number of assembly workers active at this point.

ties of the big coaches. Unfortunately, high quality body-on-chassis construction never developed in the United States. In general, the best body-on-chassis buses available in the United States will run 500,000 miles and most will only do half of this or less.

Some operators ask, what is available between these two extremes? What if your operation requires more quality, amenities and durability than the body-on-chassis buses can provide but you do not need or want to pay for the longevity required for heavy-duty scheduled line haul service?

The truth is, many operators end up paying for miles they never use when they purchase a coach. The average tour and charter operator puts around 60,000 miles a year on

a coach. Meaning, it would take more than 16 years for a motorcoach to hit a million miles. By that time, many coaches are either sold or scrapped. Plus, even though the median age for a coach in the U.S. is eight years old (according to a study by the ABA Foundation), many operators are facing a growing demand for coaches to be no more than five years old. This way, the coaches are more likely to have modern amenities like Wi-Fi and 110-volt outlets customers desire. This is a gap that the CAIO coach was designed to fill.

But why? What is it about CAIO's construction that allows it to attack a market segment already in the crosshairs of so many other coach manufacturers? The answer lies in what I call economical integral construction.



CAIO offers an extensive product line including coaches, transit buses, mini-buses and even school buses. This particular school bus has a substantial rear departure angle to operate on the back roads of Brazil.



The CAIO factory at Botucatu offers several amenities for the staff. Included is this covered pavillion where a CAIO bus on a Mercedes-Benz chassis that transported the Pope on his visit to Brazil is displayed.

Economic Integral Construction

In Europe and elsewhere, economical integral construction has been a standard for decades. Due to frequent train service, there is no heavy scheduled bus service so this type of integral construction is perfectly adequate for their tour and charter operations. In Europe this economical integral construction is generally known as “sled integral” because the manufacturers take an existing high-quality web frame body and slide the axles, drive train and running gear under it. If done well, this results in an integral body coach produced at significantly reduced cost, but still with the quality, fit and finish and longevity vastly superior to a body-on-chassis bus.

Mark Middleton, the man responsible for working with Doug Dunn and Alliance Bus Group to bring CAIO to the U.S., had been involved with buses for many years. He saw the gap between what he considered to be over-built and thus higher priced integral coaches and the body-on-chassis buses in the North American market. He decided to fill this gap by offering a coach designed from the ground up to North American specifications using high-quality components and a new take on economic integral construction. At first, this might sound like an easy task but it is not. There is much more required than you might realize unless you have been involved in bus and coach manufacturing yourself.

The two biggest challenges in doing something like this are getting a workable coach built with the desired level of quality and then setting up a system for support, service and parts.

We can start by looking at planning and building the bus itself. In general, there are two challenges. The first is the web frame body of the coach while the second is the drive train, running gear and systems.

Why CAIO?

There is a wide range of longevity in regard to integral bodies. There are manufacturers who make a fairly high mileage body but they are too expensive for this particular market. There also are several body manufacturers who provide the economy, but their quality is lacking. To Middleton’s credit, he spent the time and effort to weigh various alternatives. His choice was CAIO Induscar located near Sao Paulo, Brazil, a company with decades of success with bus building.

The obvious question is why CAIO? There are several reasons readily seen why they were an excellent choice for this. One is that there currently is no company in the United States and Canada that has any real experience and expertise in this type of sled

integral construction. A second reason is that CAIO is considered one of the largest bus builders in the Western Hemisphere. CAIO turns out more than 9,000 buses annually, many of them exported to other countries in South America, Central America, Africa and Asia. Third, CAIO has the ability to offer stainless steel as an option.

Developing the drive train, running gear and systems was undoubtedly more difficult. There are examples of buses that had a passable or even good reputation for their bodies but fell flat on their face because of drive train, running gear or systems problems. Being charitable, I am not going to give you a list. However, I will stress the point that if you want to build a decent bus you do not indiscriminately buy engines, transmissions, axles, HVAC systems and other

The CAIO operation is highly vertically integrated. In addition to building many of their own components and subassemblies, CAIO is also involved with operating buses. They build their own transit and coach seats including the models shown here.





This integral bus on the CAIO assembly line shows its web frame structure between components rather than chassis rails.



Jigs and other guides ensure a high-quality web frame on CAIO coaches. This one is being moved on one of the little rail carts.

components and then cobble them all together and hope they work. Trust me, the odds are against it.

This is where Middleton had to do some work. At the time, there simply was no manufacturer in the United States producing an axle, drive train and running gear sled or buggy package for this type of integral construction.

One possible alternative was to turn to Daimler's Mercedes-Benz plant in Sao Paulo, Brazil. Located at Sao Bernardo do Campo in Sao Paulo, this is the largest Mercedes-Benz facility outside of Germany. It covers an area of more than 1,000,000 square meters and has a staff of 13,000. What makes this Mercedes-Benz facility interesting is that it no longer produces complete buses. Instead, it produces a wide range of high-quality chassis and sled or buggy packages that go to body builders such as CAIO for completion.

I have been down this Mercedes-Benz chassis and sled/buggy assembly line in Sao Paulo. In addition to being surprisingly highly automated it also produces a high-quality product. While these components would have worked nicely with the CAIO body and produced a high-quality bus, they were rejected. The primary reason for this is because the components were not well known in the United States and could not be supported to the level that Middleton wanted. His goal was for his coaches to be engineered and assembled with the U.S. market in mind from the start.

The answer was found with Daimler's Freightliner division in Gaffney, South Carolina. The question was asked whether Freightliner could produce a sled/buggy package for integral construction using their highly regarded American components? A "yes" answer gave the CAIO project a proven package of drive train, axles and components. It also provided a group of components that could be supported and serviced by Freightliner's network of more than 400 North

American service centers and countless other independent service providers familiar with Freightliner components.

Freightliner has decided to label the unit with a title that accurately describes its function in the North American Market. Since this product is not an actual chassis – rather two separate sub-sections that are integrated into the finished product in a modular fashion – Freightliner has elected to refer to these models as Power Modules or Modules. In addition to heavy-duty, over-the-road components, these specialized units will feature 13 liter Detroit Diesel 450 engines, Allison B500 transmissions, ZF suspension, antilock brakes as well as an optional Stability Control System.

As the exclusive distributor for CAIO North America, Alliance has been increas-

ing locations and support for the CAIO product. This is a fascinating story of customer commitment that will be the topic of another article in the near future.

The Factory Tour – Headed To Brazil

What with CAIO coaches now being delivered by CAIO North America and Alliance Bus Group, it became incumbent on your editor to throw his camera bag over his left shoulder and take off for Sao Paulo and the CAIO factory.

While I left home and office with snow on the ground, I found that I was in another world in Sao Paulo and no longer needed my parka coat and sweater. Winter in the United States is summer in Brazil and Sao Paulo's climate would probably be classed

This Mercedes-Benz buggy package was photographed at the Mercedes-Benz display room at their facility in Sao Bernardo do Campo in Sao Paulo. CAIO uses high-quality components like this for some of its buses. However, on CAIO buses coming to the U.S., Freightliner components were used to ensure local compatibility and support.



as subtropical. I was told that it rarely got below 55 degrees and that most homes and offices did not have furnaces.

The next thing I learned was that unlike most of Central and South America, the native language in Brazil is Portuguese. Some of the business people do speak English and it does not take long to pick up a few important words.

Named after Saint Paul of Tarsus, Sao Paulo is the 10th largest metropolitan area in the world with a population of 18,850,000. Railroads never developed in Brazil to any extent so the backbone of city transit in Sao Paulo is a few metro/subway lines augmented by some electric rail lines powered by overhead wires. The bulk of urban transit service is provided by more than 11,000 buses, typically conventionally diesel powered.

There are smaller buses that provide a feeder service to larger bus and rail lines. However, most bus traffic rides on conventional, articulated and double articulated buses. Bus Rapid Transit (BRT) vehicles are used on some routes. To ease the traffic flow, there are special bus lanes and center platforms served by buses with doors on both sides.

This transit operation is primarily private enterprise with only a small subsidy from the government. The base fare is three Brazilian Reals, or about \$1.50 in U.S. dollars and even standing room is hard to find in the rush hours. What I found remarkable is that many of the conventional and articulated buses are high quality body-on-chassis construction. CAIO has a stake in the Sao Paulo transit service and builds somewhere



Public transit in Sao Paulo heavily depends on diesel buses. Shown here is a CAIO three-section Bus Rapid Transit (BRT) articulated bus. Note the additional doors on this side so these buses can operate in dedicated center lanes and stop at loading areas in the center of the streets.

around 700 buses annually for this operation. I was told that they currently have 16 operating garages and expect to be up to 20 in the near future.

The CAIO factory is actually located in Botucatu, about 140 miles a little bit north of west of Sao Paulo. The road there is close to expressway quality but not totally limited access, and adjacent land is rolling and green. Botucatu translates as "good air" and hence means the same as Buenos Aires. The area is certainly less metropolitan than Sao

Paulo and CAIO operates 20 bus routes to neighboring areas for staff.

CAIO first started building buses in 1946. Manufacturing is vertically integrated to a large extent with various divisions or subsidiaries providing component parts. CAIO makes their own windows, fiberglass, thermal forming, panels and other important assembly components. This results in tremendous cost savings. The entire complex at Botucatu covers more than nine million square feet with more than 1.6 million square feet under roof. In total, there are about 5,000 employees. The campus is in a rural area and is reasonably modern and clean. There are some amenities for the staff including a roofed-over pavilion where an open CAIO bus on a Mercedes chassis built for the Pope's visit in 1980 is on display.

The thermoforming operation is known as Inbrasp and covers about 700,000 square feet while the Fiber Bus operation covers more than 950,000 square feet. In addition to manufacturing parts for CAIO, these divisions also produce parts for several other vehicle manufacturers including Iveco, Scania, Volkswagen and John Deere. I am not aware of all of the technical terms, but I was impressed with the new fiberglass operations. While the older and larger parts are still sprayed on dies, CAIO is moving to a newer pressure forming system where you get a smooth surface and do not see the fibers on the finished part.

CAIO also has a huge glass operation that covers more than 2,750,000 square feet. In addition there is also a Divena Mercedes-Benz operation that is primarily a dealership that sells chassis, commercial vehicles

These two-section articulated buses are built with a CAIO body on a Mercedes-Benz chassis. CAIO has an interest in the Sao Paulo transit operation and builds hundreds of buses each year for this use.





CAIO's huge fiberglass operation builds components for several other vehicle manufacturers as well as CAIO buses.



CAIO builds its own roofs in one piece to eliminate seams and leaks. There also is an in-house glass operation.

and passenger cars.

Bus manufacturing is the largest area and covers nearly 5,000,000 square feet with a total staff of about 3,800. The bus building is also vertically integrated with subassembly work, both transit and coach seats and painting all being done in-house. One of their more impressive departments is engineering. There are about 150 people working in various types of engineering, which helps explain their large product line and number of options.

CAIO offers a wide range of products. Included is a small cargo van as well as a series of school buses. The school buses are typically painted yellow and black, but there is one model with a huge rear departure angle for operation on back roads. Included in the product line are mini-, micro- and midi-buses, several types of city buses and both two- and three-section articulated transit buses. Buses for intercity service include the Giro model in various lengths and the new Solar model.

Rear overhang on CAIO models tends to be longer than in the United States and Canada. The coaches offer optional restrooms.

Wheelchair positions are provided on many models and some transit models provide a position for a conductor or fare collector. Transit models are available with standard height, full low-floor with a side engine and low access with a higher floor at the rear.

What I found particularly interesting is that much of CAIO's production involves types not found in the United States. While they do offer some relatively standard body-on-chassis construction with the school buses and some of the smaller buses, many of their larger buses are built with high-quality, body-on-chassis construction. Depending on model or customer preference, they will use Mercedes-Benz, Scania, Volkswagen or Volvo chassis and possibly others. The resulting buses are of higher quality than what we currently have in body-on-chassis buses the United States.

CAIO has also adopted a well-orchestrated integral construction using the Power Module packages including engine, transmission, axles and suspension. CAIO connects them with an integral web frame and then builds the body up from there. Again,

this type of construction is not normally seen in the United States and is why the CAIO is filling a product gap here.

While CAIO does shift buses at various stations, particularly painting, they generally use a straight through assembly line. I was impressed by the fact that the coaches go down the line on little wheeled rail carts similar to what Eagle used in Brownsville. The reason for this is quality. If you build buses with wheels on the floor, any slight difference in the floor can cause unwanted torsion or be translated into the frame structure. The use of such a cart or something similar is pretty typical in higher quality bus and coach production.

The CAIO production sequence is fairly typical. They connect the Power Module components from Daimler/Freightliner with a web frame. Then, the web frame body is added followed by the exterior skin. There is a rustproofing process as well as basic painting. From here, components, systems, seats and glass are installed. Along the way are various quality control stations.

CAIO rolls their buses down the assembly line on these wheeled rail carts to eliminate any torsion or quality problems with tires on the floor.



At this point on the assembly line CAIO buses are turned on a turntable and sent down the next line. Note the quality web frame construction.





A CAIO bus headed for the United States is shown in one of several paint booths.



CAIO's impressive engineering section is modern and has a staff of more than 150.

There is a final station where the buses are cleaned up and inspected. Any bus that does not pass inspection gets put into a line where a special crew works on them before they are again inspected and readied for shipment. Quality control stations and inspections are built into the assembly lines. If a quality problem is discovered, it receives special attention or gets pulled out of line and put into a separate line.

CAIO has a sales export office in Sao Paulo and six regional offices in Brazil. Major markets for CAIO include virtually all of South America, parts of Central America, the Caribbean, Africa, parts of Asia and even Tahiti.

Visiting the CAIO facility in Botucatu, I was very impressed with their high quality construction. I also saw several CAIO buses

coming to the United States in various stages of construction. Their integral construction was obvious. As a result, we have determined that CAIO North America is qualified to join in our reports of integral intercity coaches being sold in the United States and Canada.

How Is A CAIO Supported?

The final part of this equation includes sales, support, parts and service. It is an unfortunate joke in our industry that many imported buses are not so much delivered but abandoned. To prevent this from happening with the CAIO product, Middleton joined forces with Dunn at Alliance Bus Group, an established bus distributor. The motto of Alliance is "Along for the Whole Ride," showing their commitment to strong after-sales customer support and service.

Alliance Bus Group has strong relationships with multiple financing providers and partially self-finances many deals. This allows for a greater range in lease and purchase terms. Given their multiple locations and large inventory, it also means they can more easily take customer trades. "Volume speaks volumes," says Dunn in talking about Alliance Bus Group's size as an advantage for its customers.

Mike Pouncey, the motorcoach sales manager for Alliance Bus Group, notes how parts and support are key to CAIO's present and future success. "One of the reasons many coaches failed before is that they didn't have good support. We know this and we know our customers' businesses. He continues by describing some of the steps Alliance Bus Group has taken to ensure CAIO's success. "We spent a lot of time pre-stocking warehouse shelves at our various locations with parts so they can be readily available. It's also why we're about to roll out new training programs for customers, drivers and mechanics."

Alliance Bus Group also provides customers with two 24-hour support hotlines and access to more than 400 service facilities through its relationship with Daimler/Freightliner. Eugene Hotard, executive vice president for Alliance Bus Group, notes, "From the start, we wanted to build an infrastructure that would allow our customers to stay on the road longer and keep profits flowing. When you take into account the lower acquisition costs, the financing options and service offerings, we believe the CAIO presents a better business model for our customers."

Conclusion

With major mechanical components sourced from Freightliner and final assembly taking place in a heavy vertically integrated facility, the entire operation fits the expectations of an efficient and well-done economical integral constructed coach. However, the question is, how does this translate into price? When I asked Dunn,

Still on its little wheeled cart, this CAIO bus is going through one of many paint booths. As is typical with higher quality coaches, the buses receive both primer and final painting. This area of the factory is due for some updating in the near future.



CEO of Alliance Bus Group, how a CAIO is priced against other integral constructed coaches, he responded, "No two sales are exactly alike, but when you do an apples to apples comparison between us and a coach made by a competitor, it is not unusual for a CAIO to save you 15-20 percent on acqui-

sition costs and even more over the life of the vehicle."

What I find interesting is that Alliance Bus Group is offering an introductory program for selected operators who qualify for a two (2) year walk-away lease. This pro-

gram allows a selected operator to try the product for two years and to simply walk away from the bus and their commitment if unsatisfied. To the best of my knowledge, this offer is unique in the marketplace and shows the confidence that Alliance Bus Group has in the CAIO coach. □



Shown is a finished CAIO coach on display at the factory in Botucatu. CAIO buses are sold and supported in the United States by Alliance Bus Group. The Alliance motto of "Along for the whole ride" starts with financing and continues through after-sales service and support.

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