

# between the BRANCHES

OFFICIAL PUBLICATION OF TIGERCAT INDUSTRIES INC.

## TIGERCAT SHIPS 10,000<sup>th</sup> MACHINE

On September 7, 2010 Tigercat shipped its 10,000th machine, a 720E feller buncher.

Tigercat's 10,000<sup>th</sup> production machine was destined for the operations of Clary Logging based in Cordele, Georgia. Owner, Robert Clary is a long-time Tigercat customer. He purchased the first serial production 726 feller buncher back in late 1992 which was the second Tigercat ever built. (The prototype 726 was purchased by Williston Timber earlier in 1992.)

According to Tigercat president Tony Iarocci, "It is very appropriate that the individual who purchased Tigercat's first production machine has also purchased the 10,000<sup>th</sup>. We have been observing Clary Logging's progressive operations for nearly two decades and are pleased to note that in addition to being good customers, Robert and his family have become respected friends."

The 720E feller buncher was built at Tigercat's rubber tire machine production facility in Cambridge, Ontario. All employees at the plant as well as many veteran Tigercat team members from other facilities assembled for a group photo around the machine.



See inside for the full story on Clary Logging. ■

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# S610C STANDS ALONE

Innovator Donald Robbins sees major improvement in his plantation stand management operations after getting 'machine makeover' from Tigercat.

—Paul Iarocci



Donald Robbins, owner of Robbins Forestry.

In early 2010 Tigercat opened a new division focusing on the development of specialized machines for off road industrial applications. Just as Tigercat was seeking to leverage its expertise in engineering machinery for severe duty applications, Georgia-based contractor Donald Robbins was searching for a manufacturer to build carriers for his spraying and fertilizing operations in juvenile pine plantations.

The 610C skidder – which was previously used as the platform for the AD610C aerial device carrier, a recent addition to Tigercat's off road industrial line – was a perfect base machine to work from. To satisfy Robbins' 8 ft (2,4 m) maximum width parameter, an extreme wheel offset would be required. This in turn would require a fixed front axle due to insufficient clearance between the inside wall of the tire and the machine. Consequently, Robbins' machine would require an oscillating centre section.

Serendipitously, Tigercat also had a customer request from Ecuador through dealer Efocol-Equipos Forestales for a simple 610C-based forwarder. This project would also entail the design of an oscillating centre section. With two different models and markets to spread the design costs over, suddenly Robbins' sprayer project was viable.

"I think quality is something that has been lost over the years. Everybody wants cheap but cheap isn't always the best. I don't want to be the cheapest, I want to be the best and I'm going to give my clients what they paid for."

— Donald Robbins

Donald Robbins, owner of Robbins Forestry Inc., has worked in pine stand management and improvement for 25 years. A multi-service company, Robbins Forestry plants, sprays and fertilizes timberland. Robbins and his machines have also been called upon for forest fire-fighting duties. "We've run water and fire retardant on the machines during forest fires for the Federal government and the forest companies," Robbins explains.

The company operates primarily in south Georgia and north Florida, serving several corporate clients and smaller private landowners. Frequently on the road, Robbins' wife Rhonda manages the office, located in Manor, Georgia.

Some of the north Florida work sites are situated in environmentally sensitive areas. The Department of Environmental Protection in conjunction with Florida's Water Management Districts has stringent regulations so accuracy is especially important. "Water Management is very strict," Robbins stresses. "Where you put your fertilizer is important. You have to be very accurate because there are a lot of wet and environmentally sensitive areas. We are accurate within 2%."



A typical operating environment for the S610C sprayers.

Robbins Forestry is engaged in spraying five months of the year and fertilizing for the other seven. Depending on the species of weed being targeted, spraying usually occurs in late summer and fall. Over the entire rotation cycle, stand management usually consists of multiple treatments of herbicide and fertilizer at establishment and several more throughout the cycle.

David Rewis, of Robbins Forestry oversees the spraying/fertilizing crews. A former teacher with a formal forestry and agriculture background, Rewis says that in the spring following a fertilizer treatment there is a noticeable difference in candle height, the lighter coloured new growth that is visible at the tops of the pine trees.

Robbins began his career working for Roger James, who passed away twelve years ago. Roger was a pioneering force in the business of plantation stand management. He came up with the idea of a skidder with a spreader body and initially designed the hopper.

James and Robbins worked together for thirteen years and built several machines, always using Franklin skidders as the base carrier. “We would cut down a Franklin, cut the blade down, take the arch off and extend the frame,” explains Robbins. “I give a lot of credit to Roger James. He was a mentor to me and

I learned a lot from him. I think he would be proud of the business today.”

Robbins has continued to improve and refine the machinery. “We have changed the design of the spreaders and sprayers one hundred percent. They used to be more prone to rollovers – we have baffles now. And the tanks are made of quarter inch stainless. They can roll over in the ditch without losing their load. We want to insure that if one does go in the ditch, we are not going to have a spill.”

Although Robbins continued to tweak the design of the sprayer tanks and hoppers over the years, the lack of improvement of the carriers caused endless frustration and significant lost production. “For the time, I guess the Franklin was a good tractor. However, they did not progress with the times,” says Robbins.



David Rewis (left) oversees the S610C crews. Van McLoon, sales representative for Tidewater Equipment in Brunswick, sold the three S610C sprayers to Robbins Forestry.

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Robbins manufactures and installs the fertilizer hoppers and sprayer tanks. The S610C accommodates both units.

“Every Franklin I ever bought I unloaded off the truck in summertime and it ran hot. That was the start of the issue. We were never able to cool them down due to the machine design. The powershift transmission was a problem. Maintenance was terrible because of the heat. The engine would overheat, then the torque converter, then the hydraulics – one thing is linked to another.” To make things worse, no other manufacturer was interested in producing such a machine because the market was so small.

“Finally we were able to convince Tigercat to build a tractor and it has been like day and night. I’ve never seen such a difference. The Tigercat is a one hundred percent better tractor than Franklin ever built. We had been locked in with Franklin and had a lot of issues they were never able to resolve. With the Tigercat tractor we feel these issues have been solved up front. We are very impressed.”

The S610C carriers zip along at a 4.8 mph (7,7 km) working speed – remarkably quick considering the density of the limby, juvenile stands. Robbins has

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a truck and operator on hand dedicated to keeping the hoppers or sprayer tanks full.

Robbins Forestry took delivery of the first S610C in June 2010, purchasing the machine from Tidewater Equipment in Brunswick, Georgia. The machine went to work straight away in the heat of summer in soft terrain – a troublesome combination. “When you’re rutting four inches deep and it is 100 degrees, you’ll find out in a hurry whether [a machine] will overheat or not,” says Robbins. Rewis adds that when you take all the downtime into account with the previous machines, production has significantly increased.

Robbins went on to purchase two more S610C sprayers for a total of three units. “I talked to probably twenty different loggers before I bought these tractors. We cover a large area,” explains Robbins who has worked as far afield as the



Robbins Forestry often operates near environmentally sensitive wetland areas in north Florida. Accuracy is of paramount importance in the application of herbicides and fertilizer.

Carolinas and Alabama. “Everybody spoke well of the tractors. That is usually not the case, but I never heard any bad things.”

Aside from improving machine availability rates, Robbins gained some additional advantages by switching his fleet over to the S610C. He is now able to run 30.5 tires, which in turn increases the payload and provides more flotation. Also, the thicker ply tire is more durable. “We are a lot

more productive now and we don’t have to reload as often,” says Robbins.

The operators also quickly realized it is rarely necessary to lock the differentials. “With the old Franklin, we had to lock in [the differential] all the time,” explains Robbins. “When you made a turn, all four tires were digging. You were tearing up the dirt road or breaking the grass loose and more likely to go down. With the Tigercat, you barely make a print.”



Drive-through service... A hopper lasts about 45 minutes. Quick reloads are required to maintain high production.



Tigercat modified the 610C carrier to achieve an extremely narrow overall width. This allows the S610C to easily pass between rows in the dense juvenile stands.

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“Another big issue is fire. I’ve had probably three or four Franklins burn over the years,” says Robbins. “Debris was building up under the engine and straw on the manifold was dropping down and catching on fire. By the time the operator knew there was a fire, there was nothing we could do about it.”

An automatic variable/reverse pitch suction fan and an additional air intake screen prevent debris build-up around the heat exchangers. Cooling air flows opposite to the Franklin machines. The operators clean the pleated pre-screen in front of the radiator on a daily basis and the debris problem that was so prevalent is a non-issue. “Now when we do our weekly service, the only thing in the bottom of the engine compartment is dust,” says Robbins.

Robbins’ collaboration with Tigercat on the design and specifications of the S610C has been a positive experience for everyone. “We were going to move upward not downward and we put our heads together and were able to do it. The engineers have been on the

ball. I am as impressed with [Tigercat’s] employees as I am with their tractors.”

Relating Tigercat’s philosophy to his own, he continues, “I think quality is something that has been lost over the years. Everybody wants cheap but cheap isn’t always the best. I don’t want to be the cheapest, I want to be the best and I’m going to give my clients what they paid for.”

Like Tigercat, Robbins’ mandate in life and business is to continually innovate and improve. “I want to grow. I don’t want to be the guy copying everyone. I want to be the innovator not the imitator. This is my life and I’ve enjoyed it immensely. I am very appreciative of what I have and what my family has accomplished. One of my daughters has a Master’s degree and the other is a nurse practitioner assisting in open-heart surgery in Atlanta. I’ve encouraged my family to be like my business...to grow and be productive.” ■

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# SWAMP LOGGERS INSPIRES MODEL BUILDER

Fred Moses of Onalaska, a small community in western Washington has an eye for detail. For the past four years Fred has been engaged in an interesting hobby – building scale models of different types of equipment used in the forestry and agriculture industries.

“The primary industries in Onalaska are logging and dairy farming. My model building hobby is normally focused on equipment that was once used in logging or farming and is no longer current to those industries,” explains Fred.

Although Fred sticks to the historical side of the heavy equipment universe, building models of machines that have long been out of production, he recently made a special exception.

“The Tigercat skidder is my first current model, inspired by the Swamp Loggers TV show, featuring Bobby Goodson, his crew and Tigercat equipment. The model is scratch built from steel, 1/16<sup>th</sup> scale and powder coated.”

“Having just completed the Tigercat skidder, I took it to a toy show and was amazed at the response by the attendees to it,” says Fred. “Nearly all the



A 630D all dualled up was inspired by Bobby Goodson and Swamp Loggers.

folks recognized it as part of the TV show and were familiar with it as part of logging in the swamps of the south. The performance of the skidders logging in the environment of the swamps is phenomenal.”

Fred shared some of his other works with BTB, including this 046 Madill yarder built in the 1960s and 1970s and widely used in the Pacific northwest, western Canada and southeastern Alaska. “These yarders were in their heyday yarding the large old growth timber found in those locations off the steep ground,” explains Fred. “They are mostly phased out of logging now but are popular in New Zealand for logging and in the US and Canada for long line excavation, mostly gravel mining and sediment pond cleaning.” ■



A 046 Madill yarder, another one of Fred's projects.



Fred Moses pictured in his workshop with the Tigercat 630D skidder.

# MILESTONES FOR CLARY LOGGING AND TIGERCAT

Veteran Georgia logger and long-time Tigercat customer Robert Clary discusses the importance of preparedness, adapting to change, good equipment and hard work.

— Paul Iarocci

Established in 1984, Cordele, Georgia based Clary Logging Inc. and Tigercat have enjoyed a near twenty-year relationship. In the words of owner Robert Clary, “We have had a lot of firsts along the way.”

Clary went out on the proverbial limb and bought the first serial production 726 feller buncher in late 1992. (The prototype 726 was purchased by Williston Timber earlier that year.) In 1997 Clary Logging also purchased the first 720B feller buncher. The 720B series was the official beginning of joystick steering for Tigercat drive-to-tree bunchers. Then Clary Logging

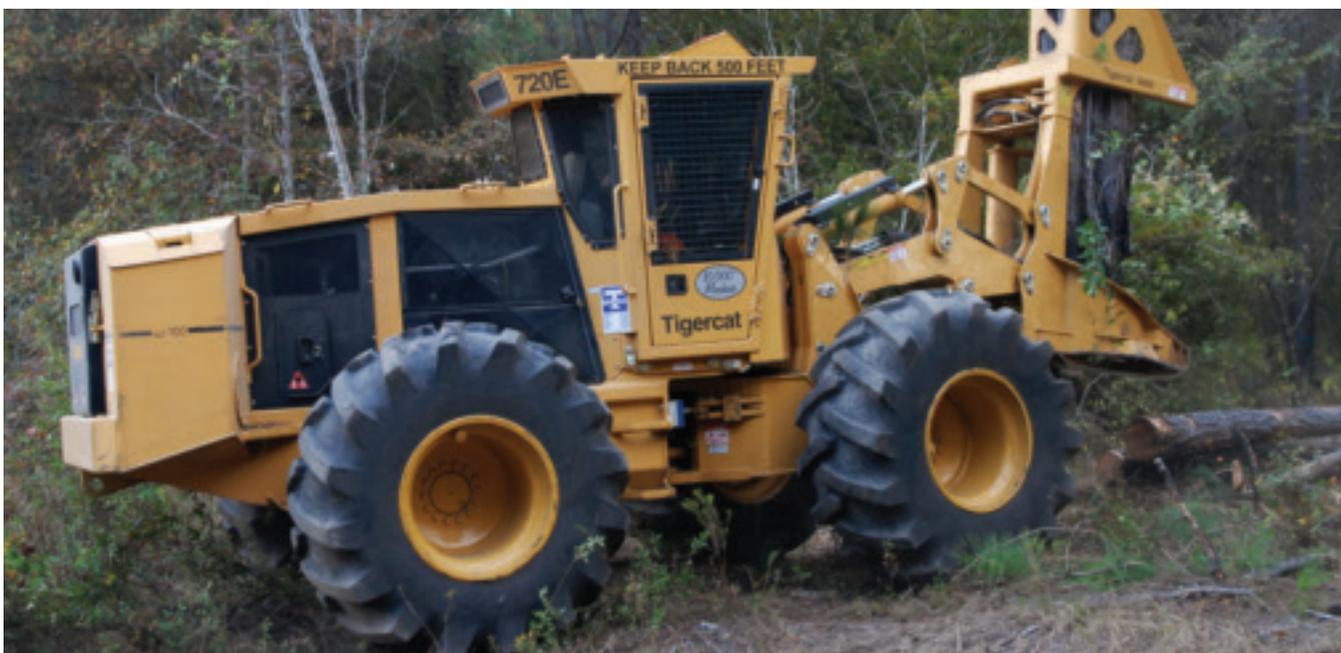
bought the first 630B – the first skidder ever to be equipped with cross-flow cooling – in 1999.

Fast-forward to September 2010. Robert Clary purchased a 720E feller buncher that just so happened to be Tigercat’s 10,000<sup>th</sup> production machine. If that were not enough, the acquisition marked yet another milestone, the 50<sup>th</sup> Tigercat owned by Clary Logging.

“If we had been using any other brand over that time period we would probably have bought twice as many just because of the durability of the Tigercat product,” says the veteran logger. “I don’t think we have ever put a centre section in a Tigercat. When we find a good product we try to stick with it.”

“We put about 19,000 hours on the first production 726 in seven or eight years. Some of them you can’t wear out. We keep some machines over 20,000 hours.” Clary concedes they have had some hose problems and they replace engines at 10,000-11,000 hours but, “Without a doubt, the reason we are in business today is because of the durability of the Tigercats.”

Robert reports receiving excellent service and back up from Tidewater Equipment in Thomasville, Georgia, singling out branch manager Charles Wright for his outstanding customer focus. “Charles really goes to bat for us and he takes care of us. I cannot say enough good about him. If we do have a breakdown, he is really good about getting us a loaner and doing updates



Robert Clary says that the 720E with 5600 bunching saw is a versatile combination for first and second thinnings and clear fell applications.

or recalls or whatever. He's a really good guy. If we do have a problem, it gets taken care of quick and doesn't linger on."

Clary Logging runs four separate crews that are set up nearly identically. Each crew has a 720E feller buncher, a single high capacity Tigercat skidder and a 234 loader with one 250B in the mix for big timber clear fell jobs. "We use all 720Es, because they are very versatile, you can thin with them or cut big timber. We use the 5600 head because of the thinning but we can still cut the big wood." Clary explains that the large capacity bunching head is essential in thinning operations to keep up production of both the buncher and skidder and avoid costly bottlenecks.

Clary runs five skidders in total: three 630Cs, the transitional model E620C and one 630D. "We like the bigger skidders for our applications." Both of the newer machines are equipped with the Turnaround seat. "The operators are getting used to the Turnaround," Clary says citing as the main advantage that the operators are able to back down the thinning corridors more quickly and comfortably.

Clary states that the 234 loader fuel economy is outstanding and that it can handle the big timber, but for a steady diet of saw timber, he prefers to keep a larger 250B on hand.

The thinning crews are set up to consistently produce twelve loads per day and can achieve sixteen to eighteen although the quota usually won't allow it. So each crew averages 60-75 loads a week depending upon quota, wood conditions and availability.

"Before the recession hit, we had one crew just dedicated to big saw timber and then we had three [first] thinning crews with a skidder, a buncher, a loader and a Chambers Deliminator." But both market conditions and rotation cycles have impacted Clary Logging in very significant ways.



Robert stands with Russell Brown (Hollywood), the operator of the 10,000<sup>th</sup> machine, which is also the 50th Tigercat for Clary Logging.

Clary explains, "The market for pulp is strong around here. The downside is that there are not as many first thinnings as there used to be." At this point in the planting and harvesting cycle in Clary's operating region around Cordele, a high number of second thinning jobs are coming onto the market. "And then you get into that quota problem with the chip and saw," explains Robert. "There isn't much demand for saw timber."

"I don't think we have ever put a centre section in a Tigercat. When we find a good product we try to stick with it."

— Robert Clary

For the loaders that meant swapping the flail chain delimiters for pull-through delimiters. Otherwise the crews were able to seamlessly switch from first to second thinning. "Timber that we thinned six or seven years ago is coming back around to be thinned again. So we do a lot of second thinning.

Unfortunately the lumber demand is not there. They don't predict the [domestic housing] market is going to come back until 2015. That is a pretty bleak outlook for saw timber."

Clary Logging uses contract haulers and also owns and operates fourteen Mack trucks. Timber is purchased through a separate timber buying company, Peach State Timber, headed by Clary's partner Eddie Biggers, who does an exceptional job lining up good wood to cut. Clary Logging then hauls the pine pulp, some hardwood, chip and saw logs to a number of mills in the area including Weyerhaeuser, Rayonier, Griffin Lumber Company and Gilman Paper Company.

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Clary's first Tigercat was also the first serial production machine, a 726 feller buncher built in 1992.

Originally from Florida, Robert Clary moved to Georgia in 1980 and began contracting to Empire Forest Products. It was around that time that he met Eddie Biggers. "He kind of was getting frustrated and I was too and we thought we'd try it on our own, so we formed a timber company in 1984," Robert recalls. "We went from one crew to several crews. It's a family business. We got children and grandchildren working." At one time the employee count was as high as 70. His daughter Gina, who manages the office, confirms that there are currently 34 on the payroll.

Clary Logging has a number of dedicated long-term employees. Operator Mark Thomas has been with the company for 30 years and Russell Brown (Hollywood) for 25 years. "Hollywood started on skidder in 1986. We got him right out of high school." Robert's son, Toogie a top notch buncher operator who died tragically in 2005 trained Hollywood. "Toog saw something in him that no one else did. Now he is a really good thinning man. A lot of landowners like him doing the thinning on their land," Clary says of Hollywood who operates the 10,000<sup>th</sup> machine.

Clary stresses that they provide a service to landowners. "I feel like we have a pretty good customer base and lots of repeat business. We do a pretty good job for the landowners and they ask us to come back."

Robert takes pride that the crews are able to work autonomously, achieving high production rates while providing a high quality service. "Every employee knows what is expected of them and they get up in the morning and do it. That's what it takes," says Clary. "Only once in a while do we have to 'touch the controls' so to speak."



Robert credits Charles Wright, branch manager at Tidewater, Thomasville with providing outstanding service support over the years. (L-R) Charles Wright, Robert Clary and Don Snively on the delivery day.

“Our philosophy is to try to stay prepared so that whenever there is an opportunity, we will be ready. Just because the mill shuts us down, it doesn’t mean we go home. We work harder when we are on quota. We try to get prepared for the next day or the next week. We try to be ready before the mill is ready.”

Clary is also meticulous about record keeping, especially in regard to costs and maintenance intervals. “Whatever is bought or put on or used, we have a record of it. We try to keep a good eye on costs, monitoring the price of fuel, oil and tires. If you are going to be in business, you have to know your costs. We try to buy the kind of wood that we can make a living on, do a good job, keep the equipment up and keep the landowners satisfied. Hard work keeps everything the way it ought to be.”

Robert says the need to become more efficient is ongoing as input costs rise and markets get squeezed in a poor economy. “The mills are suffering and they have to do what they can to stay in business and it filters right on down. We just try to shake it off and keep on doing what we are doing... It will all work out in the end.”

Clary acknowledges that the industry has changed a great deal during his tenure as a professional logger and he understands the importance of both adapting to change and keeping daily business in perspective.

“It used to be where you could take a skidder and a used dozer and get eighteen to twenty loads a day in clear cuts using the dozer to keep the loader right on top of the wood.” This kept skidding distances to a bare minimum – something that is not possible today where a landowner may only want one a single deck on a 40-acre tract.



Don Snively, Tigercat district manager for Georgia and Florida who delivered Clary’s first machine also delivered the 10,000th.

“Thinning is a whole different ball game. You have to stay within the rows and the corridors. You have to worry about skinning trees and root rot. And you have to get the count right,” says Clary, highlighting the importance of good, skilled operators. The majority of the second thinning tracts Clary Logging works are felled on an operator select method based on the number of residual trees per acre the landowner specifies. The operator takes plots and spaces the trees, achieving highly accurate counts.

As for globalization, Clary admits that it has created low cost overseas competition. But it has also helped. “A lot of the overseas markets want product coming from wood that has been thinned and properly managed, rather than just clear cut. It is a big factor in selling the end product.”

And what about biomass? “I’ve got mixed feelings about the biomass,” says Clary. “I’m not sure if that is going to help us or hurt us. It is definitely going to make the fibre supply more competitive. Where that fibre is going to come from is anybody’s guess. Pulpwood in our area is already very competitive. If there is another market for it, it might be a good outlet but it is the same situation... What is worse, having a large quota and no wood or lots of wood and a small quota? Biomass isn’t some magic solution for the whole wood business. They are getting a lot of government money and grants and free money puts a lot of people on the bandwagon. Whether it can be self-sustaining afterward remains to be seen.”

“I don’t envy anyone who’s young and trying to break into the wood business. There is a lot of uncertainty. It is going to be tough for our children and grandchildren in any business.”

But it is Robert Clary’s strong convictions and laser-like focus that ultimately cuts through all the uncertainty. “We are Clary Logging and this is what we do,” he plainly states. “We are going to work every day whether we have quota or not, timber or not, equipment or not. That is just what we do and that is what we are going to continue to do. If we don’t have quota, we’ll stack up and load up every trailer we got and bring them to the yard and when that’s over with we’ll figure out something else.” ■

## HIGH PROFILE

Late in 2009, Tigercat president Tony Iarocci spoke to International Forest Industries editor, Chris Cann, about a career in the business of customer satisfaction.

— Reprinted in part, International Forest Industries, February 2010

*How did you get started in the forestry sector; is forestry in the blood?*

My personal exposure to the forestry industry began in the early 1960's. As an engineering student, I spent a work term at Koehring-Waterous in Brantford, Ontario. I subsequently joined the company upon completion of my studies in mechanical engineering.

Koehring-Waterous was engaged in the manufacture of mobile cranes and excavators, machinery for the pulp and paper industry and was just beginning development of tree harvesting equipment. It was an amazingly great place for a young engineer to launch his career.

At that time, the Koehring harvesters were sold directly to large forest products corporations in eastern Canada that conducted their own harvesting operations rather than using contractors. The machine development and field testing activity was very much a co-operative effort and the significant financial risks involved were shared by both Koehring and the end users, an arrangement that encouraged risk taking with respect to product development and provided the opportunity to design and build innovative, state-of-the-art machines. This also accelerated the accumulation of knowledge and in turn the mechanization of tree harvesting. Unfortunately, this phenomenon is likely to never reoccur in the industry. In today's environment the manufacturer must bear the full development costs and consequences related to inevitable shortcomings that occur in innovative new products.

To say that I enjoyed my 22-year stay there and learned a great deal would be a gross understatement. Progressing from project engineering to customer service and executive positions in sales, marketing and engineering management offered challenge



and education. I left Koehring-Waterous just before Timberjack purchased the company. As is well known, Timberjack was subsequently acquired by Deere.

In 1991 Ken MacDonald [CEO of MacDonald Steel] approached me with a proposal to join his organization with the intent to form a new company devoted to the design and manufacture of forestry machines. I readily accepted. Travelling with Ken who piloted his own airplane, we did market research focusing on the southeastern United States. We quickly identified an opportunity to provide loggers with a better drive-to-tree feller buncher. Enlisting the invaluable assistance of John Kurelek, a former boss and mentor at Koehring-Waterous we worked with Jon Cooper, a designer at MacDonald Steel and other very capable MacDonald Steel staff members to complete the prototype 726 drive-to-tree feller buncher in time to demonstrate it at a live exposition in Georgia in April, 1992. Later in that year, Grant Somerville and other former colleagues at Koehring-Waterous also joined us. With a strong engineering team supported by competent staff in other functional areas, Tigercat has since developed an extensive product line.

*What is the most important business concept to keep in mind when leading one of the world's premier machine suppliers to the forestry sector?*

From day one, we adopted a strategy to build tough, reliable, productive machines aimed at reducing the cost of harvesting trees.

Tigercat is first and foremost an engineering company with strong focus on the customer's needs. Our heavy investment in R&D has resulted in substantial innovation that has not only permitted us to carve a very respectable marketshare in an industry with declining total sales (as machines are becoming more productive and longer lasting) but has also raised the

industry standard as Tigercat's innovative designs have been adopted by competitors. Before Tigercat came into existence, drive-to-tree feller bunchers, offered by no less than four manufacturers had a life expectancy of three years. Tigercat drive-to-tree machines exhibited more than double the life. Some years later the remaining competitors followed suit.

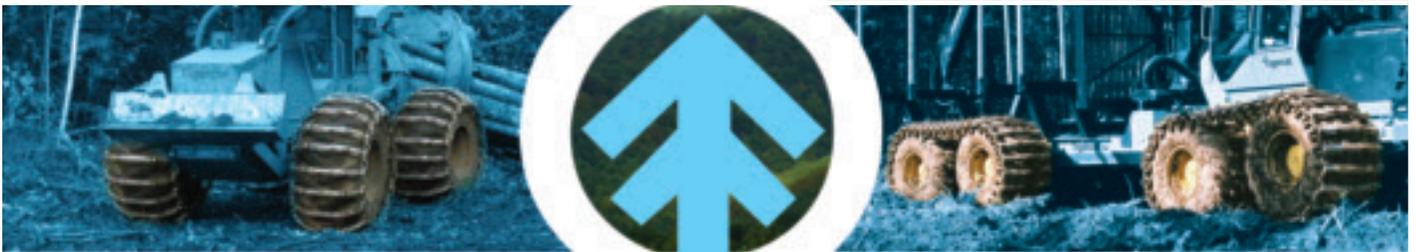
Other notable Tigercat innovations include high capacity bunching saws, long life articulation joints used on all Tigercat wheeled machines, hydrostatically driven skidders now with the Turnaround seat and ER or Energy Recovery boom system for track machines. All of this was accomplished by reacting quickly to our customers' needs. Our competitors, most of which are huge multinational conglomerates, simply don't respond that quickly.

*What has been the most important technical development by Tigercat over the years; is there a recent piece of new machinery, a fledgling concept or design that the company is particularly excited about at the moment?*

Identifying our most significant development is difficult and maybe this is a reflection of what Tigercat is all about. The Tigercat brand earned its way into the industry by developing products that offered more to attract the buyer's interest. Maybe our most important development has been assembling a large team of engineering, manufacturing, and field staff with the ability to execute our broad research and development program.

When discussing the importance of Tigercat's technical developments, it may be of interest to consider its beneficiaries. Certainly, the dual post, high capacity bunching heads introduced in the mid-nineties were quickly recognized to markedly increase productivity and enabled our drive-to-tree feller bunchers to produce to their full potential. This was a benefit both to the logging contractor in lowering production costs and to Tigercat since it led to a rapid increase in marketshare. The felling head design was shall we say greatly *admired* and imitated by some of the other players in the marketplace. cont'd on page 14

## TWO CENTURIES IN EUROPE, TWO DECADES IN NORTH AMERICA



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Even to this day we are seeing our high capacity heads applied in novel ways. A number of contractors are using our twenty inch [DT2000] shear head on track feller bunchers in eucalyptus plantations with rocky soil conditions.

On the other hand, our ER boom system, which may be the most significant advancement in track feller buncher technology, increased machine productivity and significantly reduced fuel consumption but was of marginal financial benefit to Tigercat since we did not receive sufficient compensation to offset the development expense and additional hardware costs. As with any new development the market requires considerable time to understand and judge its value and in this case the sheer magnitude of the long term cost savings was typically undervalued. However, we estimate that ER has saved the industry somewhere around 70 million litres of diesel fuel to date, so we continue to offer it as standard equipment on all track feller bunchers and harvesters.



We estimate that ER has saved the industry somewhere around 70 million litres of diesel fuel to date.

The hydrostatically driven skidder offered the industry improved wheel speed and torque control that was immediately obvious and customers were able to quickly identify the value of the innovation. While this advancement required intensive development, the performance advantages have made this a successful investment of our resources.

Similarly, the six-wheel bogie skidder offered a significant new machine to the industry. Development was expensive and often frustrating but the end

result is a very productive machine with good market potential.

More recently, we have introduced our new skidder cab with the Turnaround seat. We see this as being very beneficial to our customers especially from the standpoint of operator comfort.

*The biomass sector is becoming more important for forestry companies and contractors; how does the company see the biomass sector evolving over the next ten years?*

Biomass will benefit Tigercat because there will be demands for new and specialized equipment for the harvesting, processing and handling functions. It will benefit our customers not only by adding an additional market and revenue stream but also because it may have the effect of localizing what is increasingly becoming a global commodity. In many of the more developed biomass markets that we have studied in Europe and some regions of North America, the product is often consumed locally for power generation.

*As a proud Canadian company, how has Tigercat established its brand around the world; are there plans for further international expansion; which markets do you see as the most important?*

Our company tries very hard to treat our customers as we would wish to be treated ourselves. We are aggressive in product development as we believe the industry, now more than ever, must adapt in order to survive. We accept that we will make some mistakes and if this happens we will do all within our ability to respond. We open our doors to our customers and operate on a very informal basis. This approach has resulted in our successful growth.

Unquestionably North America remains the highest volume and consequently our most important market. However, we are well established in such markets as Australia, New Zealand, Scotland and South Africa. We value international markets in that they offer tremendous opportunity for future growth and as such we have invested heavily in order to build a presence in other parts of Europe, Russia and South America. ■

# A VERY BRIEF HISTORY OF PAPER

— Paul Iarocci

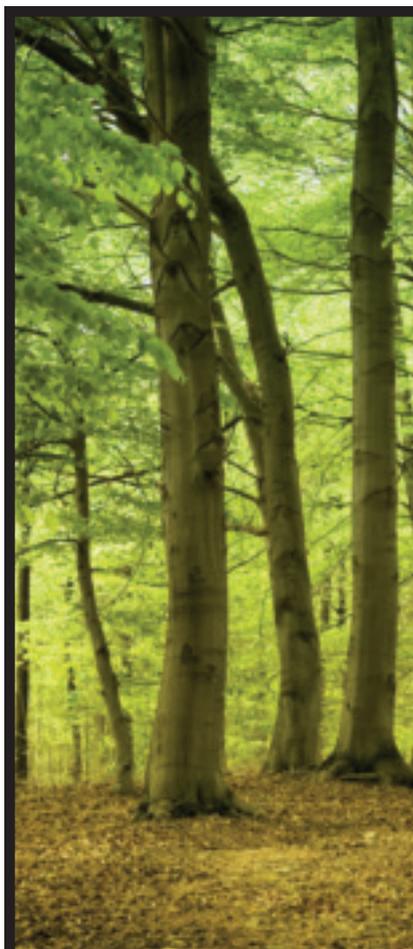
During a family vacation in Italy this past summer, my wife and I happened upon Il Museo della Carta, a pulp and paper museum in the coastal town of Amalfi along the beautiful Bay of Salerno. In an era where oil gets all the press, it was refreshing to be reminded that paper has historically been described as one of the most important, civilization-advancing commodities of all time.

The origins of paper date back over 2000 years to China. The Chinese method of manufacture was

closely guarded for hundreds of years. Here it is in brief and at its most primitive: mulberry bark and other fibrous plant matter and later on cotton or hemp rags were submerged in water and ground to a pulp by hand with a mortar and pestle. A mould constructed with a bamboo frame and a fine screen was submerged in the vat and deftly pulled out again, trapping a thin layer of pulp. The pulp was then set to dry in the sun. It was a slow and laborious process with inconsistent results.

The technology eventually migrated to various Arab civilizations between 751 and 1050 CE, progressing from Bagdad to Persia, Syria and eventually Egypt, where there was no shortage of linen and cotton for raw material. It is quite probable that this technology transfer began with The Battle of Talas (Kyrgyzstan) in 751, the culmination of an alliance between the Tibetans and Abbasid Arabs formed in an effort to rid themselves of Chinese Tang Dynasty incursions and occupation. When the battles were over, Chinese

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Industrial Engines for Forestry Power



PROUDLY POWERING



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prisoners held in Samarkand – some of who were papermakers – were convinced to divulge the secrets of their trade in exchange for freedom.

The technology continued to spread through North Africa and finally into southern Europe by way of the Saracens, the Moors in southern Spain and contact between European and Arab trading partners. The Maritime republics of Amalfi, Genoa, Pisa and Venice often obtained foreign goods and know-how in advance of other European states on the strength of good trading relations with Middle Eastern civilizations, especially through trading houses operating in such regions as Syria and Palestine. With ample supply of water, Amalfi, home of the oldest Italian maritime republic was a great place to establish paper mills. The Amalfians may even have imported master papermakers to run the first mills that sprung up in the 13<sup>th</sup> century.

### From the home to the mill

Although technological advances were painfully slow to come about in the late Middle Ages, the papermakers of Amalfi managed improvements both in process and quality. Paper production was industrialized in Amalfi in the 13<sup>th</sup> century with the help of hydraulic power and a shaft and cam wheel system to run the machinery. Hammer piles or stampers with multiple wooden, stone or iron headed mallets created a more uniform pulp in a fraction of the time it took to produce pulp manually.

No longer was the production of paper a homemade endeavour but instead a process overseen by artisans in a mill using water-powered grindstones and other machinery. To speed up the drying process, once the sheets were removed from the mould, they would be placed between pieces of felt, stacked and then pressed with a wooden screw press, to squeeze as much water as possible out of the paper before air drying.



Europeans began to mechanize the papermaking process in the 13<sup>th</sup> century with the help of hydraulic power.

After drying, the Amalfi papermakers utilized a gelatin liquid rendered from animal skin and bones to size the paper, dipping the sheets to fill the tiny pores. This product called *carnnicio* was a vast improvement over previously used pore closing liquids derived from cereal starch. The treatment had multiple benefits – a smoother finish, impermeability to ink and improved preservation against the effects of time and moisture. Afterward the sheets were hand polished with wood, stone or flint. This process too was eventually mechanized with the use of a heavy water powered mallet.

### The Watermark

Artisan papermakers who sought to protect the quality of their product, invented the watermark, which served as a trademark, a certificate of origin and a mark of quality. The watermark was formed by crafting a design with wire that was fitted over the mesh of the mould. When the pulp was initially pressed, the presence of the raised wire design caused the paper to be slightly thinner where it made contact, ultimately appearing as a translucent, permanent mark on the sheet.

Watermarks and quality assurance were taken very seriously. Strict punishment was meted out to those who tried to pass off a poor quality product or attempted to copy a watermark. The rudimentary watermarks of early European paper mills were further developed, eventually becoming the base technology of anti-forging systems for bank notes.

### Further advances...

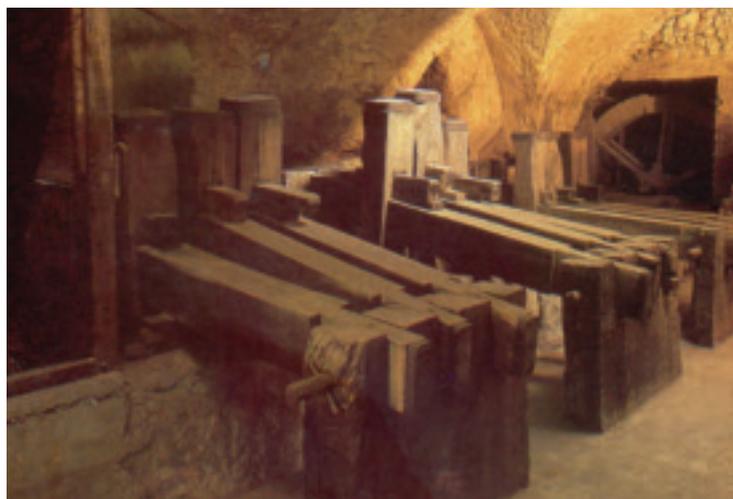
It wasn't until 1670 that the next major breakthrough in papermaking technology came. Invented by the Dutch, the Hollander beater was a horizontal drum equipped with dull gear-like blades. The assembly was situated in a vat and the entire drum could be progressively lowered, thus reducing the clearance between the blades and the plate at the bottom of the vat, in order to further refine the pulp. The end result was a more consistent fibre, less fibre breakage and a much more efficient process. It is estimated that the

Hollander could produce in a day a quantity of pulp that would take a traditional stamp mill eight days to produce.

Due to the stubborn nature of the master papermakers who clung to the beloved tried and tested methods, it was another half century before the Hollander beater was installed in Amalfi and other European paper mills.

### The first recycling PR campaign?

Rags, the raw material for pulp, were a precious resource and strictly controlled throughout the Renaissance and Early Modern periods. For instance, if you lived in Venice in the 1300s, you would not have been allowed to export rags – they were reserved for the Treviso paper mill. Sweden ordered by royal decree that old rags were never to be thrown away or burned but instead stored in a dry room until such time that they could be collected. By the end of the 1500s, the Danish monarchy had launched a public relations campaign aimed at convincing the population to deliver all old rags to the paper mill rather than throw them away.



Hydraulically driven hammer piles from the 15th century used to pulverize rags into a pulp slurry. (Courtesy of Angelo Tajani)

Unfortunately by the end of the 1600s hard times beset much of Europe and rags started to become scarce. Royal decree or not, people were poor, hungry, cold and unwilling to part with anything that could be used to mend old clothes or blankets. The problem only became more acute; the shortage was exacerbated by the steadily increasing demand for paper.



A wooden screw press next to a drying rack.



A close-up of the horizontal drum section of a Hollander beater (late 17<sup>th</sup> century). The dull blades produced a more consistent, higher quality fibre and significantly advanced mill productivity.

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## Necessity, invention and beehives...

After observing the nest building activities of wasps, the physicist and naturalist René Antoine Ferchault de Réaumur (1683–1757) proclaimed that the wood fibre used by the insects could also be used to make paper. Certain species of wasps collect wood fibre, scraping dry wood with their mouths. The wasps chew the wood and mix it with saliva. Using their legs, they further refine the slurry and then spread it into a thin sheet. Does this sound familiar? Once dry it forms a very durable paper and nest building material.

In 1719 Réaumur tried to convince the scientific community in France that rags were not necessary in order to produce paper. Of course it would be another century before his ideas were taken seriously.

In 1843, Friedrich Gottlob Keller, of Saxony, invented a wood-grinding machine that produced a pulp suitable for papermaking. During this period, experimentation with chemical pulping was ongoing



My wife Cindy attempts to make paper for the first time in the cellar of Il Museo della Carta in Amalfi.

as mechanically ground wood pulp was not ideal for producing fine paper.

The soda process was developed in Britain by Hugh Burgers and Charles Watt in 1851. Finding the United States more receptive to the idea, they were awarded a US patent for their chemical pulping process in



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1854. The first mill to make commercial use of the soda process was commissioned in Philadelphia in 1855.

### Further mechanization

Whether it was labour shortages, labour unrest, the desire for cost reduction, the need for increased production or all of the above, the slow and laborious traditional methods of paper production were to be swept away by the industrial revolution.

In 1798 Nicholas Louis Robert, an accountant at a French paper mill in Essonnes completed a hand operated prototype machine that could produce paper in lengths up to 3,6 m (12 ft). Successive improvements, patents and convoluted ownership changes eventually led to financial support from Henry and Sealy Fourdrinier, paper industry innovators.

The first Fourdrinier machine was installed in a paper mill at Apsley, Hertfordshire in 1803. It was capable of producing endless sheets of paper. The pulp was poured onto a looped wire cloth. As it travelled to the press section, it was transferred on to a continuous felt blanket and pressed between rollers to make it dry enough to be rolled on a reel. Then the roll was cut into sheets and air dried. In 1822, a drying function was added – the paper passed over steam heated



This paper machine from the 19th century was capable of producing endless sheets of paper using wood pulp.

drying cylinders, fully mechanizing the process. Later adapted to wood pulp, the Fourdrinier became the dominant technology in the 20th century.

The industrialization of paper production and the use of wood fibre loosely coincided with the decay of the craft industry in Amalfi. In the heyday of the mid 1700s, there were over 50 mills along the Amalfi coast. By the late 1800s the number of mills had dwindled to a dozen as the efficiencies of industrialization trumped the love of fine quality artisan cotton paper. ■



The site of Il Museo della Carta, a former paper mill. The museum was established by Amalfi papermaker Nicola Milano, whose family has been in the papermaking business for many generations. The museum houses an excellent collection of restored machinery in working condition, an exhaustive reference library and many examples of fine artisan paper.

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## dealer news

# ADDITIONAL DISTRIBUTION IN BRAZIL

Tigercat, Latin Equipment do Brasil Ltda. and Tracbel S/A are pleased to announce that Tracbel S/A has been appointed as an additional authorized Tigercat distributor in Brazil.

The addition of Tracbel S/A to Tigercat's distribution team benefits all stakeholders in Tigercat's Brazilian operations. The focus of all parties is to provide Tigercat's Brazilian customer base with the highest production and lowest production cost harvesting systems.

Tracbel S/A is responsible for sales and product support for Tigercat machinery operating in the states of Espirito Santo, Minas Gerais, Rio de Janeiro, Sao Paulo, Para, Amapa, Amazonas, Roraima, Goias, Tocantins and the Federal District.

Latin Equipment do Brasil Ltda, which has represented Tigercat in Brazil since 1999 will continue to distribute and support Tigercat machinery operating in the states of Acre, Alagoas, Bahia, Ceara,

Maranhao, Mato Grosso, Matto Grosso do Sul, Paraiba, Parana, Pernambuco, Piaui, Rio Grande do Norte, Rio Grande do Sul, Rondina, Santa Catarina and Sergipe and will also be able to continue to service and sell either parts or Tigercat machinery to any of its existing customers in Sao Paulo.

### About Tracbel S/A

Tracbel S/A has been in business for more than 42 years and carries other leading brands of construction, agricultural and material handling equipment. Tracbel represents such companies as Volvo, Massey Ferguson, Michelin and Clark and serves customers in the mining, heavy construction, civil engineering, steel, forestry, logistics, agriculture and sugar industries. In 2009 Tracbel won the Exame Magazine award for best managed equipment dealership company in Brazil. Tracbel has also been designated best Volvo dealer in Latin America for 10 consecutive years.

### About Latin Equipment do Brasil Ltda.

Latin Equipment has been in business 11 years, focusing on the forestry industry in Brazil, Uruguay, Chile, and Argentina as well as sugar cane harvesting in South America and the Caribbean Islands. In Brazil, Latin Equipment is the exclusive dealer for Continental Biomass Inc. material reduction equipment and Precision Husky chain flail debarkers and paper-quality chipping systems. ■



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