

B E T W E E N the BRANCHES

Tackling the Tough Stuff in Sweden

Tigercat finds niche in one of Sweden's most demanding forest machinery applications. – Paul Iarocci

In a demanding application where duty cycles approach 100% in soft ground, steep hills and rock strewn terrain, Tigercat has found a new market for its super-duty forwarders and six-wheel drive skidders. The country is Sweden, the application is ground scarification and the requirement is for high horsepower, durably constructed prime movers.

In Sweden, the scarifying process generally involves the use of a disc or trenching attachment fitted to the rear of a heavy-

duty carrier. The machine travels over a previously harvested tract, breaking through branches and tops left over from the harvesting process and creating rows of inverted turf. The mounded rows provide new trees with more light, water and access to nutrients, encouraging improved root formation.

In some cases saplings are manually planted on the edge of the mounds. In other cases, seeds are planted during the scarifying process using a system integrated

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**Tough terrain.
The discs float
over the rocks.**



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into the attachment. Yet another method involves natural regeneration by seed trees left on the harvested area.



Tommy Olers, foreman for Akers Skog.

Tommy Olers, foreman for Akers Skog is operating one of the company's two 1075 scarifiers fitted with a Bracke T26.a disc trencher attachment. At 205 kW (275 hp), the 20-tonne (22 tn) 1075 is Tigercat's largest forwarder. It is quickly becoming regarded as the forwarder of choice for scarifying applications. Tommy is currently working the machine in southern Sweden near Filipstad where the ground will not freeze until January. At that time the machine can either be converted to a standard forwarder for the

winter or Tommy can seek contracts to the south in more temperate Germany.

Akers Skog provides scarification services to forest industry giant Stora Enzo as well as a Swedish government-owned company. These companies try to place the 1075 scarifiers in sites with the most malevolent terrain and greatest amount of rock, recognizing there are few machines or contractors in Sweden that can handle these difficult contracts. Although it varies according to the terrain, the production rate averages one hectare (2.47 acres) per hour in tough ground.

Tommy puts in long days, routinely working 12-14 hour shifts. As the sole operator, he put 800 hours on the 1075 in the first two months. Spending that much time in the machine, comfort is an important factor. Tommy says that the double bogies and centre joint oscillation contributes to a significantly smoother ride over the rough ground. The bogies also lower the ground pressure, allowing the machine to work wetter, softer terrain.

Another advantage of the forwarder based scarifier is the crane. "I need the crane for balance and weight distribution for the middle and front of the machine. Also to move large trees and obstructions," Tommy asserts.

The disc trencher is designed to float over rocks. "You must plan in advance where your path will be in order to avoid the large rocks.



The 1075 scarifier working on a challenging site for Stora Enzo. A near 100% duty cycle on steep terrain and rocks is extremely demanding on the machine.



The scarifying attachments invert the top layer of turf and soil to give new trees a higher survival rate.



Smaller rocks are not a problem,” Tommy says. “The machine is very strong and well built. It can do work that no other machine can do.”

Kurt Collin, owner of F:a Kurt Collin and Per Tysk, owner of F:a Per Tysk Tyskgården both focus exclusively on scarification services. Kurt runs a new E625C with a rotating seat (now called the 635D) and son Per has the distinction of running the very first forwarder ever produced by Tigercat. This prototype 1018 model was converted to a scarifier when Per bought it back in 2005.

Both machines are equipped with three-row mounds designed for sites with less rock cover. The mounder attachment creates intermittent patches of

Kurt Collin likes the two-position rotating seat and rear drive controls.

inverted soil as opposed to rows and doesn't handle rocks as well as a disc-type trencher. Kurt and Per's specialty machines are best suited to the mix of wet and hilly terrain encountered within a few hundred kilometres of Filipstad in the southwestern part of the country.

The rear bogie smooths out the ride.

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The E625C is equipped with a three-row moulder.

The relatively short skidder-based machine is easy to turn at the end of a row, increasing productive time. The two-position rotating seat and reverse drive controls also reduce end-of-row turn times. "The rotating seat is the best thing," explains Kurt. He says that the skidder maintains quick travel speeds, routinely covering one hectare (2.47 acres) per hour.

As for ride quality Kurt says that the oscillating front axle combined with the rear bogie makes for a smooth ride and comments on the favourable weight distribution that allows him to tread lightly onto the soft, wet terrain that he often encounters. ■



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PROUDLY POWERING



Get the Dirt on Filters

Hydraulic Oil Filtration

– Rick Routliffe, service representative

Why is hydraulic oil filtration so important? The simple answer is that it keeps hydraulic systems up and running, reducing maintenance costs and machine downtime. Without filtration, contaminants in the oil would quickly lead to excessive component wear and imminent failure.

In days gone by, hydraulic components were somewhat forgiving of less than optimal maintenance practices but the modern machinery of today reflects our demands for higher production and greater fuel efficiency. As a result, the level of sophistication of the hydraulic systems has increased significantly. Components are manufactured to extremely tight tolerances in order to reach our productivity and fuel economy goals. Consequently, these hydraulic components demand much more effective filters to provide contamination control.

It is the job of your hydraulic filters to remove contamination from the oil flow. Just because a replacement filter fits in the same location as your Tigercat branded filter, it does not mean it will have the same performance qualities.

There are many important characteristics and criteria to consider when choosing a filter. Tigercat filters have been selected based on criteria related to the machines such as the types of components being protected, system flow and pressure, the duty cycle of the machine, operating temperatures and oil viscosity. Other characteristics of the filter to consider: filter efficiency and micron rating,



filter head bypass rating and water separation ability. Two very important filter characteristics are the media type and dirt holding capacity.

Media Type and Internal Support. The fundamental method of differentiating one brand of filter from another is to closely consider the filter media type used. There are two basic media types, cellulose and synthetic.

Cellulose or paper has long been the traditional media used in hydraulic filters. It is created from naturally grown wood fibres and has a cardboard-like structure. Although a filter using a cellulose-type media may be efficient to some degree, its inconsistent fibre size and irregular structure creates undesirable flow restriction. The pleats in cellulose elements are usually unsupported and prone to collapse under pressure thus reducing the filtering surface area of the element.

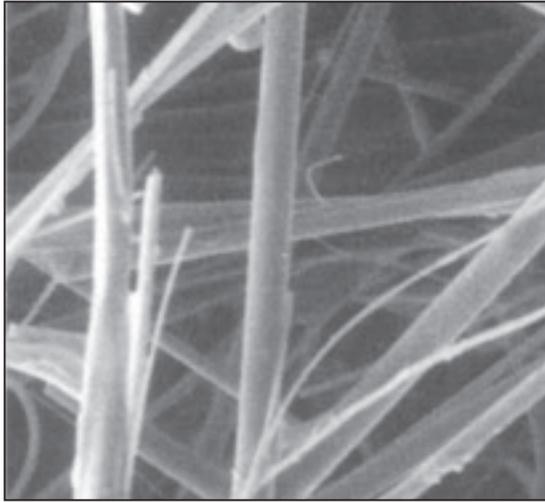
The newer synthetic media type is a better option. Often referred to as microglass or fibreglass, it has a very fine fibre size and uniform structure. This results in less flow restriction and a more uniform filtering pattern. Synthetic filter elements are usually supported with a wire mesh to ensure that the pleats do not collapse.

Tigercat brand filters are carefully selected based on criteria related to the machines they are equipped on as well as the characteristics of the filters themselves.

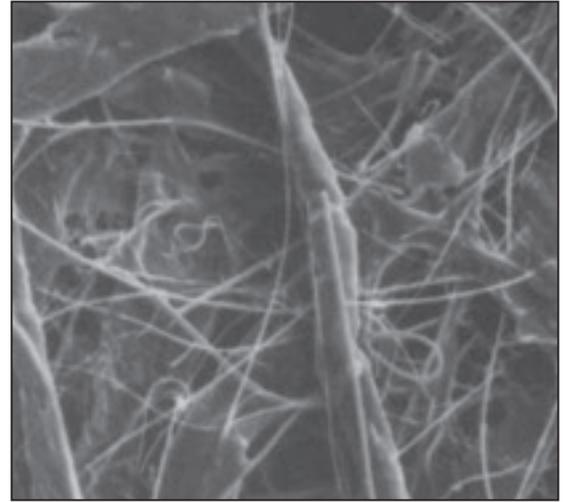
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A microscopic view of a synthetic media. The consistent structure of synthetic media filters has been engineered to provide excellent filtration qualities while minimizing flow disturbance.



Dirt Holding Capacity. This is another useful criteria to consider when evaluating the differences in filters. The dirt holding capacity is a specific weight measurement of how much debris or particles the filter can hold. Once the maximum capacity level is reached, the filter's resistance to flow increases to the point where the filter head begins to bypass and filtration no longer occurs. The filter must then be replaced.



Cellulose media filters are very inconsistent in structure and result in higher back pressure.

To ensure peak performance and maximize component life, Tigercat recommends the exclusive use of Tigercat brand hydraulic filters. Talk to your Tigercat dealer for more information on Tigercat hydraulic filters and the availability of a Tigercat Oil Analysis program. ■

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Hardwood Thinning in Maine

– Paul Iarocci

With 90% of the state covered in trees, Maine is the most heavily forested state in America. 17.2 million acres of productive timberland include 7 million acres of northern hardwood, 5.6 million acres of spruce and fir and 2.3 million acres of aspen and birch. In addition, there is a significant amount of white and red pine, elm, ash, maple, oak and hickory.

Approximately 60% of Maine's forests are held by non-industrial, private owners and 30% by forest industry companies although there has been a shift of ownership in recent years from forest companies to large land management organizations like Wagner and Plum Creek.

Mexico, Maine based Nicols Brothers Inc. cuts primarily for Seven Islands Land Co. which manages nearly one million acres (404 000 ha) in Maine for the Pingree family and a handful of other individuals and companies. (Shipping magnate David Pingree began to acquire land

in Maine over 150 years ago and today the Pingree family is one of the larger private landowners in the United States.)

Jim Nicols, owner of Nicols Brothers explains that he is almost exclusively involved in hardwood selective thinning for Seven Islands. A typical prescription might include yellow birch, sugar maple and poplar with densities ranging from 10-30 cords per acre. (One cord of hardwood equals approximately 2,3 tonnes.) Glancing across a recently harvested tract with autumn colours at their apex, the area looks more like rugged parkland than a commercial forest that large machinery has just vacated. This is testament to Nicols Brothers' high quality services.

Jim's Tigercat equipment line-up includes an 822 feller buncher with 8,000 hours which and has been virtually problem free. "In four years, I've hardly welded on the head," he says. Jim also has a newer 822C buncher. His

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The new 635D pulling a 10 ton drag down the narrow skidder trail.





The need to lay tops and limbs on the skidder trail may be reduced by the lower ground pressure machine.

most recent purchase, a new 635D skidder in early October, is the first in operation in North Amercia.

“The plan is to replace two 748s with the 635D,” Jim explains. He has already traded one of the Deere machines. The second, a 748H model, is still working in tandem with the 635D but “after two days we were able to back right off with the second machine,” he says.

Jim is currently experimenting with both bunching and skidding techniques, working to devise a system that will maximize the productivity of the 635D and the overall system. The main difficulty in integrating the high capacity machine into a fairly tight hardwood thinning application is figuring out how to fill the 25 ft² (2,32 m) grapple – especially on flat or downhill skids. “I’m hoping for 16 to 20 ton twiches,” says Jim who estimates he is getting eight to ten tons (7-9 t) so far. This means acquiring two or more large bunches per drag which in turn affects how the feller buncher collects and lays the wood.

In Jim’s precision applications, the wood cannot be laid in the stand or it will scuff the standing trees as it is pulled out by the skidder. The bunches have to be within and somewhat parallel to the skidder trail in order to avoid damaging the stand.

Rather than merchandising in-field, Jim

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trucks tree-length logs to a grading yard near his shop in Mexico. He gets better merchandising results and says it makes it more convenient for his wood buyers. The highest grade logs are used to make specialty lumber for furniture. The next grade is for veneer and the lowest grade supplies the pallet industry.

Although lumber markets have been plumbing the depths in 2008, the market for hardwood pulp is strong in Maine. In addition, a number of converging factors are fueling a robust and well developed biomass market: the northeast’s reliance on expensive oil for residential heating, a relatively large number of biomass-fed generating plants and northeastern cap and trade programs like the Regional Greenhouse Gas Initiative (RGGI). This gives contractors like Nicols access to an additional lucrative market with long term growth potential.

Nicols cites weather variability and wet terrain conditions as his primary challenges. For instance, in early October when he acquired the 635D, above average rainfall was limiting the ability to run the skidders. Excessive rutting is not permitted on the skid trails because of the damage caused to the root mass of the residual stand. Aside from halting production, the only option is to bring branches and tops back into the bush to line the trail with. While this mitigates wheel rutting, it also slows production slightly but more significantly, it robs Nicols of the biomass revenue component.



Jim Nicols (right) with new Frank Martin Sons salesman Jeff Fogg and Tigercat US sales manager Kevin Selby (left). Jeff has come on board to cover western Maine as part of Frank Martin Sons expansion into the entire state.

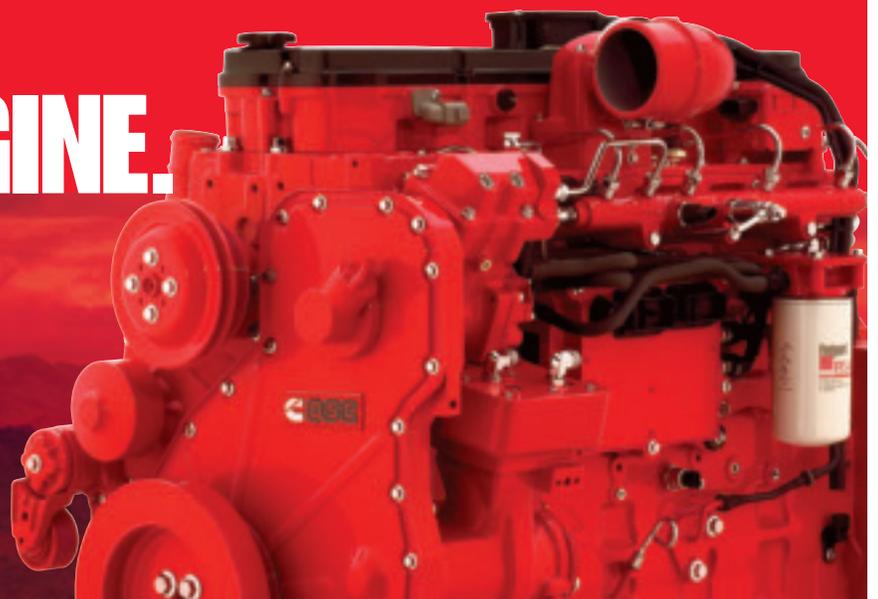


One of the advantages of the 635D that Nicols hopes to exploit is the low ground pressure. The light footprint should reduce rutting, keeping branches and tops at roadside for chipping or grinding rather than lining skidder trails with the valuable material that can make up 10-20% of the tree.

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Maine contractors are buying into the high capacity six-wheel skidder concept for steep and soft terrain capabilities. Paul Theriault (Paul Theriault Trucking Inc.) recently purchased two 635C machines from Frank Martin Sons, the first six-wheel drive skidders in the state. The two Tigercats replaced five skidders: three Timberjack 460Ds, one Timberjack 560D and one CAT 535B.

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Wind Power

In addition to biomass generating plants like the half dozen owned and operated by Boralex in the northeast, the region is developing other green energy systems. The Redington Wind Farm four miles (4,5 km) west of Sugarloaf Mountain ski area near Stratton, Maine is currently underway.

Once complete the Maine Mountain Power (MMP) owned wind farm will produce clean, electric power from 30 modern wind turbines, generating about 250 million kilowatt hours a year, enough to power 40,000 homes. Each windmill has three 150 ft (45 m) blades mounted on a 260 ft (80 m) high tower.

Mark Theriault's company, Theriault Tree Harvesting Inc. has been under contract to provide roadside, right-of way and turbine site clearing services for MMP. Twelve miles (19 km) of existing logging roads have been refurbished and another twelve miles of access roads are being constructed. In total about 300 acres (102 ha) of forest must be cleared to accommodate the project although 220 acres (90 ha) will be regenerated. Mark's 11,000 hour 870 feller buncher, the only machine of its kind in the northeastern US, has performed most of this work and is shown here clearing at roadside. The new road is visible in the background.



Furthermore, in Maine where the months of April and May are lost to spring breakup, the average harvesting season is 40-42 weeks in duration. The six-wheel machine may allow Jim to extend operations into the shoulder season. Of course the winter freeze up from December to late March is the most productive season. "It's cold but it's the best time to log," says Nicols.

Jim's thorough production and cost records and creative ideas related to both the harvesting and marketing sides of the business are allowing Nicols Brothers to succeed regardless of specific market conditions and in spite of general economic woes. He worries as much about demographics and long term development trends. Although Maine is home to a mere 1.3 million residents and urban sprawl is minuscule compared to other parts of the country, "The land is becoming more valuable than the trees that are growing on it, especially near the lakes," Jim asserts. Once productive forest land is being cleared or converted to non-productive land. With only 6% government ownership of Maine's forests, the fate of the state's forest industry clearly rests in private hands. ■

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Focus on Safety

When the Clouds Roll In: Lightning Safety Awareness

– Robin Barker, engineering administrator

What is a Lightning Strike?

Lightning is a discharge of the electricity produced by a thunderstorm. As the thunderstorm develops, many small particles of ice within the storm clouds bump together. These collisions create a positive charge at the top of a cloud and a negative charge at the bottom. As this continues, a second positive charge builds up on the ground beneath the cloud. It is concentrated around the highest objects such as hills, trees, buildings, equipment and even people. When the difference between the electrical charge in the cloud and on the ground becomes great enough to overcome the resistance of the insulating air between them, an electrical current flows instantly. This is a lightning strike.

The electrical potential in a lightning strike can be as much as 100 million volts. Lightning

strikes can occur over distances as great as 60 km (40 mi). Lightning travels both in front of and behind a thunderstorm, so strikes can occur before or after rain. Lightning can hit in the same place and often spreads out 18 m (60 ft) over the soil around the strike point.

Thunder always accompanies lightning. When lightning occurs, the air through which it travels is instantaneously heated to a temperature in excess of 28 000 °C (50,000 °F). The air expands rapidly due to this heating, then quickly contracts as it cools. It is this contracting shock wave that we hear as thunder.

Lightning Safety

Despite the popular myth that being struck by lightning is an unlikely event, the statistics show that lightning strikes occur frequently. In many areas of the world, lightning strikes are

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second only to flooding as the greatest cause of storm related death and injury. Although only 10% of lightning strike victims are killed (virtually all from cardiac or respiratory arrest) over 70% of survivors suffer severe, life-long injury and disability including memory loss, fatigue, chronic pain, dizziness, sleeping difficulty and the inability to complete several tasks at one time.

Forestry professionals are at high risk because their work is outdoors and close to known strike points such as tall trees and heavy equipment. Loggers can increase their chances of avoiding a lightning strike by following a few simple safety practices.

1. Designate a member of your crew to:
 - Monitor daily weather forecasts
 - Observe local weather conditions
 - Alert all other members of the crew when a possible lightning threat develops
2. When a storm moves nearby, don't start or continue any work that cannot be stopped immediately.
3. Anticipate a high-risk situation and take action early by moving to a low-risk location. Do not hesitate. If there is lightning, you are in danger.
4. Obey this rule: If you see lightning, flee. If you hear thunder, clear.

5. Do not follow the now obsolete guideline to take shelter when the time between seeing lightning and hearing thunder is 30 seconds or less. This does not provide sufficient time to ensure safety. Always follow step 4.
6. Remain in your safe location for 30 minutes after the last sight of lightning or the last sound of thunder.

The safest location during lightning activity is inside a fully enclosed and substantially constructed building such as a house, office, school or shopping area. These are safest because of the electrical wiring and plumbing they contain. Should lightning strike, the electrical current will travel through the wiring or plumbing into the ground. When such a building is nearby, always seek shelter there first.

Unfortunately loggers do not often work close to buildings and therefore other alternatives must be considered. Sheds, weather shelters, hunting blinds, tents and other partially open or small structures are not safe as they lack the electrically grounded components of larger buildings. They are intended for sun or rain protection only. Do not seek shelter from lightning strikes inside these structures.

The second safest location during lightning activity is inside a fully enclosed car, van, truck or bus with a metal roof and metal sides. The electrical energy of a lightning strike to these vehicles is carried to ground by the conducting outer metal surfaces. This is called the skin effect. Do not seek safety from lightning strikes in vehicles with fiberglass or plastic body shells or in convertible top vehicles as they do not offer skin effect lightning protection.

Heavy forestry equipment such as a skidder, loader, feller buncher or forwarder with a fully enclosed rollover protective structure (ROPS) offers the advantage of the skin effect and is therefore safe in electrical storms. However, machines with a rollover canopy only are not safe against lightning strikes as they are open to electrically conductive rainwater and do not benefit from the skin effect. Operators of these machines must exit the cab and get to a safer location.

Rubber tires on motor vehicles and heavy equipment do not increase safety from lightning strikes. Lightning has already travelled a great distance through the air to strike the vehicle. In comparison, a few inches of rubber offers absolutely no additional insulation.

To summarize, if you are outside and see lightning or hear thunder, get inside. Run to the nearest building, motor vehicle or fully enclosed ROPS cab immediately. If you are already inside a building, don't watch the storm from open windows or doorways. Stay in inner rooms. Stay well away from corded telephones, electrical appliances, lighting fixtures, radio microphones, electrical sockets and plumbing pipes and fixtures.

If you are already inside a motor vehicle or fully enclosed ROPS equipment cab, stay inside. Don't step outside of the vehicle to move to another shelter. Very dangerous electrical pathways to ground may go through you. Shut down all operation, turn off the engine and close the doors and windows. Sit squarely in the seat with your hands in your lap and feet flat on the floor mat. Do not touch any metallic objects referenced to the outside of the vehicle including door and window handles, control levers, foot pedals, the steering wheel and cab interior walls. Do not touch radios or telephones connected to an outside antenna.

If you are caught outside and have no where else to go:

1. Avoid wide open areas where you project above the surrounding landscape.
2. Seek shelter in a low place, such as a ditch, ravine, valley, canyon or cave.
3. Get away from open water such as ponds or streams.
4. Do not take shelter under any isolated tall trees or small groups of trees.
5. Seek shelter amongst the dense, thick growth of the shortest trees.
6. Avoid entering any small enclosures or shelters.
7. Do not seek shelter under motor vehicles or heavy equipment.

8. Keep clear of any materials that can conduct electricity such as wire fences and gates, metal pipes, poles, rails and tools.
9. Stay at least 15 m (50 ft) away from metal objects such as a fuel tank, vehicle or machinery.
10. Stay at least 5 m (16 ft) apart from anyone else so that lightning won't travel between you.
11. Do not use a telephone except for emergencies.

If you feel your skin tingling, your hair stands on end, if light metal objects vibrate or you hear a crackling sound, lightning is probably about to strike. You only have a few seconds to act:

1. Put your feet together. Crouch down in a baseball catcher's position. Hold your head down. Cover your ears to protect them against the noise of the thunder.
2. Do not lie flat on the ground. By touching as little of the ground as possible, the lightning may not move across the ground to you.

What if a co-worker has been struck by lightning?

1. You can touch the victim immediately; there is no residual electrical charge.
2. Call your local emergency response telephone number immediately.
3. If the victim has no pulse, their heart has stopped or they have stopped breathing, start cardiopulmonary resuscitation (CPR) or mouth-to-mouth resuscitation immediately. Use a portable defibrillator if one is available.
4. If possible, move the victim to a building as soon as possible. Remember, you can get hit by lightning too.

To further increase your awareness about lightning safety, see the following web sites:

National Weather Service Lightning Safety
www.lightningsafety.noaa.gov

National Lightning Safety Institute
www.lightningsafety.com

Tigercat debuts 635D at Demo 2008

With upwards of 6,000 attendees from around the world, Demo 2008 was a successful show. "Despite the challenges that the forest industry is facing, the 11th edition of Demo International® certainly provided a much needed boost of confidence in the future of the forest industry for contractors, woodlot owners, forest product companies and all of the suppliers at the show," says Peter Robichaud, executive director of the Canadian Woodlands Forum.

Tigercat demonstrated both tree-length and CTL systems with an 845C feller buncher, E620C skidder, H855C harvester



Cassie Purple, communications coordinator for Ledwidge Lumber poses with the Tigercat mascot. Ledwidge Lumber, a family-owned sawmill based in Enfield, Nova Scotia hosted Demo 2008 on one of its sustainably-managed woodlots.

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Piloted by Keith Hiltz, the Tigercat 845C feller buncher equipped with a 5400 series saw handled the felling duties.

matched to the TH575 harvesting head and a 1075B forwarder. Static equipment included a 610C skidder, a telescopic boom equipped LH830C harvester and an M726E mulcher. Tigercat also helped out neighbouring exhibitors, providing a T250B loader to chipper manufacturer CBI to feed its 6800PT grinder and delivering biomass material to Precision Husky's stand with a 1055 forwarder. Finally, as a leader in the development of high capacity skidders, Tigercat took the opportunity to debut the new 635D six-wheel drive transporter.

The new 635D is the most advanced, efficient, high production and operator friendly skidder ever produced by Tigercat. While the 635C was equipped with an 8.3 L engine, the D-series is powered by the 194 kW (260 hp) Cummins QSB6.7 Tier III. Improvements to the hydrostatic driveline and control system enable the 635D to achieve improved performance and superior fuel economy out of the smaller displacement engine.



Tigercat debuted the 635D six-wheel drive skidder. The innovative design features ergonomic joystick steering and a dual position rotating seat with full rear-facing drive controls. The skidders were operated by Stanley Sinclair.

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A variable/reversible pitch Flexxaire® engine mounted fan further contributes to energy efficiency by automatically matching the fan blade pitch to cooling requirements.

Inside the cab is a rotating seat with a two-position mechanical lock providing full rear-facing drive capability. The steering wheel has been replaced with armrest mounted joystick steering for improved ergonomics. Drive pedals are located at both the front and rear of the cab. The next generation IQAN control system has improved functionality and a simpler, more intuitive user interface.

Exhibitors and Demo International® organizers also raised over \$8,000.00 in support of the IWK Children's Hospital through various initiatives. Tigercat sold commemorative Demo 2008 t-shirts with all proceeds going to the hospital. "As a Canadian owned, family oriented company, it was a natural decision to help raise money to assist the IWK Children's Hospital Foundation," said



Ron Montgomery, Tigercat's Canadian sales manager.

Special thanks goes out to E&R Langille Contracting, Hodgson Chipping Ltd, Wajax, the Tigercat set-up crew and the operators. E&R Langille's Stanley Sinclair operated the skidders. Ivan Cummings, also an operator for E&R Langille, ran the H855C. Paul Hodgson, Hodgson Chipping operated the 1075B and Hodgson Chipping operator Keith Hiltz ran the 845C feller buncher. ■

The E620C pulling a large load.



Staying in the Loop

Open and closed loop track drive systems and real story on tractive effort

– Andy Hoshel, product manager, track machines

The tracks on a typical feller buncher are operated by one of two hydraulic systems. In an *open loop system*, the track drive motors are controlled by valves operated by a large pump that also typically operates other machine functions. This is called open loop because the pump sends oil to the drives, (or other machine functions) then the valve returns this oil to the reservoir.

In a *closed loop system*, there is one drive pump for each drive motor with no valving between the two. The oil travels from the pump to the motor, then back to the pump without first returning to the reservoir. A charge circuit must also be part of the system to make up for oil leakage and to flush out hot oil and contaminants.

TigerCat builds track feller bunchers with both open and closed loop track drive systems. There are advantages and disadvantages of each. Choosing between the systems is dependent upon the operating conditions and the operator.

Advantages of open loop

Lower up-front cost. The machines are equipped with fewer pumps and no pump drive gearbox.

Lower maintenance cost. The maintenance and future replacement costs will be lower without these extra components.

Less parasitic loss. With fewer pumps and no pump drive gearbox, the horsepower used just to turn the rotating components is reduced.

Disadvantages of open loop

When multiple functions are combined on one pump, high power losses can result if



An L870C with open loop track drives working a steep slope on Vancouver Island.

the functions are operating simultaneously at different pressures. Imagine driving down a steep slope while raising the boom. It takes very little power to drive the machine downhill, yet the pump must supply oil to the drive valves at the same pressure it takes to raise the boom. This wasted power is turned into heat in the hydraulic oil and can be a significant drain on the system. Even steering wastes power. When turning, the inside track takes less power to operate than the outside track, yet the pump must supply oil at the highest pressure.

Advantages of closed loop

Hydraulic efficiency. Each drive pump will operate only at the pressure required to turn its motor.

Improved performance. Even with a big pump, a fast and demanding operator can overtax an open loop system by operating many functions at once. The machine may either reach the power limit of the engine or the oil flow limit of the pump. With a closed loop system, the pumps will only take the power required, freeing up resources for other jobs. The closed loop system offers better ability to simultaneously operate multiple hydraulic functions. Because the tracks will respond to the operator's input regardless of what else is going on in the hydraulic system, the closed loop machine is smoother to operate, reducing operator fatigue.

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Regenerative braking. When travelling downhill, gravity is pulling on the machine and the hydraulic motors must brake the machine to prevent it from running away. The motor braking pressure turns the pumps, which in turn drives the gearbox and engine. This power can feed other machine functions.

What About Tractive Effort?

The terms *tractive effort* and *drawbar pull* refer to the force a machine's track system can generate. Measured in kilonewtons or pounds-force, it is

the force that drives a feller buncher to climb a hill, push through soft terrain or drive over an obstacle. The *tractive effort to weight ratio* or *drawbar pull ratio* is a commonly used indicator to rate machine performance and is calculated by dividing the tractive effort by the machine's gross vehicle weight (GVW). A 1:1 ratio means the traction force is equal to machine weight, while a 0.5:1 ratio delivers a tractive force of half the machine weight. So what ratio does a machine need for good performance?

This varies with the machine and its application but a good rule of thumb for feller bunchers is a minimum ratio of 0.8:1. More tractive effort can be better but there are trade-offs; in this case speed and weight. Deeper gear ratios increase tractive effort but reduce top speed. Adding larger drive train parts to regain this lost speed increases weight, the very thing tractive effort is fighting to overcome. With the component parts available today, tractive ratios between 0.8:1 and 1:1 make the most sense.

The machine's maximum grade ability is determined by traction between the track shoe and the soil as well as the machine's overall stability. Beyond some optimum point the tracks will simply spin.

Because some manufacturers advertise very high tractive effort numbers, it is important to understand what the numbers mean. First off, some advertised ratios are calculated using

100% system efficiencies and do not relate to actual machine performance. Tigercat's advertised specifications represent realistic values.

Higher tractive effort doesn't necessarily increase slope capability. Maximum grade ability is determined by traction between the track shoe and the soil and overall stability. Beyond some optimum point the tracks will simply spin. Furthermore, high tractive effort achieved with very deep ratios produce high track motor and gearbox input speeds, significantly reducing the life of the components.

A recent change in the gearbox ratio for the Tigercat L830C and L870C (open loop) carriers has increased tractive effort from 325 kN (73,000 lbf) to 367 kN (82,600 lbf). This represents a drawbar ratio of approximately 1:1. The new deeper reduction gives the open loop machines better climbing ability at the expense of speed.

The closed loop system transfers more *power* to the tracks because two closed loop pumps can deliver more oil than a single open loop pump. More track power allows the closed loop machines to climb steep slopes more quickly and maintain speed longer before shifting to low range. Additionally, the shallower gear ratio permits higher track speed. The LX830C and LX870C (closed loop) feller bunchers have 343 kN (77,100 lbf) of tractive effort. Experience has shown that this is sufficient to climb any slope on which the machine can safely operate.

Don't be fooled by marketing hype and big brag numbers. Tractive effort for all Tigercat models (open and closed loop) is reported to be sufficient for even the most extreme conditions. ■



Hot rod. The LX822C with closed loop track drives is a high performance machine. With 293 kN (66,000 lbf) of tractive effort and a lighter overall weight, it moves quickly on steep slopes and performs better than machines with much higher published tractive effort figures.

Frank Martin Sons to distribute Tigercat throughout Maine

Tigercat is very pleased to announce that Frank Martin Sons Inc has been awarded exclusive, authorized full-line distribution rights for Tigercat machinery in the entire state of Maine.

Tigercat would also like to announce that West Mount Inc will no longer distribute Tigercat equipment. According to US sales manager Kevin Selby, this is the result of a mutual and amicable decision. “We would like to thank West Mount for fourteen years of service,” says Selby, adding “Frank Martin is presently researching areas in mid-Maine to establish a second branch location. They are looking in the Skowhegan area with hopes of having something in place by the end of the year.”

In the short term Frank Martin Sons will support existing West Mount customers with two mobile service technicians. Brent Angevine will be based out of Bethel and Bruce Bourgoin will be based in Bangor. Jeff Fogg, formerly of Milton CAT has been hired on as a sales representative to help cover the new territory.



Well respected and entrenched in Maine’s forestry industry, Frank Martin is based out of Fort Kent Mills. The family owned business has been operating since 1952 and has represented Tigercat for thirteen years.

Forest Centre Supports Prostate Cancer Foundation

Tigercat’s Australian distributor Forest Centre Pty Ltd based in Tumut, NSW donated \$2,000 to the Prostate Cancer Foundation of Australia. In a predominantly male industry, managing director Lex McLean made the decision to support this cause not only to raise money but awareness. Lex used the venue of AusTimber 2008 held in Mount Gambier this past March to solicit cash donations for Tigercat and Forest Centre merchandise. Forest Centre then matched the donations received.



Forest Centre’s Lex McLean presents a cheque for \$2,000 to Dr Tony Wilson for the Prostate Cancer Foundation of Australia.

Bullock Brothers Opens New Store

Tigercat distributor Bullock Brothers expanded its operations this year with an additional store located in Dillwyn, Virginia. Tommy Parks is the store manager. Bullock has two other locations in Smithfield and Garysburg, North Carolina and serves the state of Virginia and a large swath of North Carolina. The address and phone number is:

Bullock Brothers Equipment
284 Main St, Dillwyn, VA 23936
Phone: 434-983-4880

Tidewater on the Move

Tidewater has closed its Percy, Arkansas location and moved to a new facility in Hope. The new address and phone number is:

Tidewater Equipment Co.
1006 North Hervey St., Hope, AR 71801
Phone: (870) 777-3352 Fax: (870) 777-4100

More Product Support in Southern Hemisphere

Tigercat Industries is pleased to announce that two new product support representatives have joined the company for increased coverage in Australasia and southern Africa.



Steve Green

Steve Green has joined Tigercat as product support representative, Australasia. With ongoing success and machine population growth in the Australasian marketplace, Steve Green's expertise will play a key role in Tigercat's regional support strategy. Glen Marley, district manager Australasia

and southeast Asia noted that Steve has demonstrated excellent technical expertise and customer focus in his involvement with the Forest Centre Support Plus program and in the independent operation of his own mechanical services firm.

Based in Launceston, Tasmania Steve will focus on service training, machine demonstrations and advanced trouble shooting. He will act as a key conduit and liaison between the field and factory personnel.

South Africa has seen a veritable population explosion of Tigercat machines in the last two years. To cope with increased product support and training requirements, Jeff Cave has joined the Tigercat team as product support representative for southern Africa. His expertise will play a key role in Tigercat's regional support strategy. Jeff will be based in Pietermaritzburg, South Africa.

Southern hemisphere marketing manager, Gary Olsen commented on the timing of this addition as being important in providing superior support to a market area that has undergone rapid expansion. Jeff's ability to support and train dealer personnel will aid in the efforts to ensure best in class product support in Africa.



Jeff Cave

New Product Support/Operator Trainer based in BC

Gary MacDonald has joined the Tigercat team as a product support representative with a special focus on operator training and Tigercat harvesting heads. With



Gary MacDonald

specialized knowledge of harvesting and processing equipment, Gary will be aiding in the support of the Tigercat harvesting head program. As an experienced operator, Gary will also be working in the capacity of operator trainer. Although based in Prince George, BC, Gary will also

be travelling internationally to train operators and support Tigercat harvesting heads and other products worldwide.

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