

# Asphalt Recycler Comparison

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## RENOVA Outperforms BAGELA

Only two asphalt recyclers compete in the 8 to 10 ton per hour space. While each essentially produces hot mix asphalt from old or existing asphalt, their technologies, processes and end results differ dramatically. RENOVA is a new (2015) American-made asphalt recycler that competes with BAGELA, a 20-year old German technology that has enjoyed solitary momentum and has dominated the US market for +10 years, with no effective competition or challenge to its technology, until the advent of RENOVA; the newest, most modern recycling technology in the current market.

RENOVA, while equivalent in size and speed of production to BAGELA, has been designed to overcome deficiencies of the BAGELA. The result is superior operational flexibility, controllable operator parameters, safer operation, easier cleaning, less likelihood of internal breakage, better mobility to and from repeated repairs, and markedly better quality hot asphalt mix produced. In addition, RENOVA is manufactured with replaceable and readily accessible American-made components. And, ultimately, RENOVA is less expensive than BAGELA.

RENOVA is capable of multiple tasks that BAGELA has not incorporated and cannot duplicate due to its inherent mechanical design. RENOVA offers as standard equipment advanced features with its machine that BAGELA does not (all detailed herein). Only RENOVA, with an exclusive proprietary RENOVA product, makes it possible to convert 100% Reclaimed Asphalt Pavement (RAP) into cold mix. For the first time ever, a recycling machine can both recycle old used asphalt and manufacture cold mix (cold patch) from RAP. This can only be done with a batch process recycler. BAGELA, with its continuous process, cannot do this.

The common standard of measurement used to compare these two machines is the “peak” production rate per hour i.e. the amount of hot mix that can be produced in the span of one hour. BAGELA claims to produce 9 to 10 tons of hot mix per hour. RENOVA’s typical production rate is from 8 to 9 tons per hour. In reality, the production rates for each machine varies depending on numerous factors which effect both technologies dramatically such as (1) whether one is processing millings or chunks, (2) the state of those millings and chunks – the quality, the quantity, density and moisture content, (3) heat of the mixing drum as a function of the number of previous sequential cycles run, (4) temperature of the millings and chunks, (5) ambient temperature, (6) operator efficiency, and, most importantly, (7) efficiencies or inefficiencies of the process and the mechanics of the machines, themselves.

Fully hydraulic, both unloading hot mix from the RENOVA into a waiting application and loading product to be processed into the hopper of the machine for entry into the mixing drum is accomplished in moments. Assuming optimal conditions with the previous indicated factors, RENOVA most often achieves its stated production rate. BAGELA, conversely, has the disadvantage of multiple inefficiencies of its machine mechanics and process. BAGELA’s stated production rate (9 to 10 tons/ hour in optimum conditions) is affected substantially by a complex technology which exhibits a myriad of issues and inefficiencies (detailed herein) which reduce its effective rate of production and, more importantly, negatively affects the quality of hot mix produced. Some BAGELA owners report only realizing an output of 6-8 tons/hour. And, in attempt to overcome the issue of BAGELA’s deficient hot mix quality, some BAGELA owners have turned to RENOVA for RENOVA’s proprietary rejuvenator product.

BAGELA specifications follow, with specific issues and inefficiencies detailed, along with solutions RENOVA provides with its newer, more modern technology.

| CATEGORY  | BAGELA REALITY & ISSUES   | RENOVA SOLUTIONS  |
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| <b>GENERAL</b>  |   |   |
| <p>BAGELA is a diesel-powered, trailer-mounted, continuous operating “portable” asphalt recycler.</p> | <p>Validation of the impracticality of BAGELA as a mobile asphalt recycler is the fact that the vast majority of BAGELA machine owners have positioned their recyclers on elevated embankments or platforms in a stationary setting due to the inefficiencies of BAGELA’s mechanical design and its continuous operating process (details discussed within). In fact, the axles and wheels of some BAGELA machines have been removed with the remaining recycling unit placed permanently on cinder blocks or oak beams.</p> <p>BAGELA proclaims to produce 9 to 10 tons of hot mix per hour. This stated rate of production assumes optimum conditions and it ignores the inefficiencies of BAGELA’s design and process that materially affect the real production capacity of the machine on a regular basis and, perhaps, more importantly, the quality of the hot mix that is produced.</p> <p>The output of the BAGELA recycler relies on a consistent flow of material into the machine, whether millings or chunks of asphalt; thus, creating a flow and force of material moving forward through the mixing process to its ultimate discharge at the opposite end of the mixing drum. 100% of the recycled hot mix must be discharged with none held back in the drum. BAGELA’s operator must deal with an entire load discharged to the ground where the accumulating pile of hot mix begins to cool</p> | <p>RENOVA is a diesel-powered, heavy-duty trailer-mounted batch process mobile asphalt recycler. RENOVA’s batch process produces 2-tons (4,200 lbs.) of hot mix per cycle, with the entire load processed as a batch, with each cycle ranging from 12-to-20 minutes, producing from 8 to 9 tons of hot mix per hour. It does so whether in a stationary setting or when used for mobile purposes moving from site to site.</p> <p>RENOVA is both recycler and hot box, since it can travel with hot mix contained within it. RENOVA has no time-consuming setup or shutdown procedures. The machine, on a substantial tri-axle trailer provides the stability needed for mobility and makes it possible to travel fully loaded (17,600 pounds) presuming 4000 pounds of material on board).</p> <p>The advantage of the batch process recycler is the ability for the operator to make as little or as much hot mix as is desired at the optimum temperature, without wasting any material. The operator merely tilts the mixing drum down from its discharge elevated position, keeping the remaining mix in the drum where it is either kept hot or can be reheated. Efficient onsite recycling and repair is achieved with an asphalt recycler that has the flexibility to produce batches of hot mix in whatever quantities may be needed; small or large (up to 2-tons per cycle).</p> |

| CATEGORY                             | BAGELA REALITY & ISSUES   | RENOVA SOLUTIONS  |
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|                                      | <p>down and there may be more mix produced than is needed, thus, generating waste. In the event that more hot mix is produced than is needed and discharged to the ground, to be used again it must be scooped back up and re-loaded into the recycler. And, then, there is the issue with the design of the BAGELA where, in most cases, it is difficult for a frontend loader to get its bucket up under the machine to receive the discharge of the processed hot mix (discussed in more detail below). The BAGELA process creates challenges requiring its operator to accommodate the machine's limitations by handling more mix than always needed.</p> <p>The weight of the BAGELA is stated at 11,000 pounds.</p> | <p>The RENOVA machine, itself, weighs 13,500 pounds.</p>  |
| <p>Continuous feed and mobility:</p> | <p>Material to be processed in the BAGELA must be fed into the machine continuously and because of this, a dedicated frontend loader with bucket is required to lift material into its hopper at the top of the machine (8- to 9-foot high). A second frontend loader typically receives BAGELA's discharged hot mix or scoops up its discharged hot mix wherein it is then loaded into a hot box or into the bed of a truck for transport. To function from one repair site to another when used as a mobile recycler, repeated mobilizations of the BAGELA and supporting equipment are required.</p>   | <p>Unlike BAGELA, requiring two frontend loaders for its process to operate at peak and a truck or hot box, RENOVA requires minimal auxiliary equipment. A single skid steer is adequate to load the RENOVA hopper, which may be loaded as low as 2-feet off the ground. The same skid steer can receive the discharged hot mix that has been produced. No other heavy equipment is needed to load millings/chunks or to receive the discharge of hot mix. To transport hot mix to a repair site, no hot box, truck or frontend loader is required. Instead, the RENOVA can travel with the 2-tons of hot mix to a repair site.</p> |

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| <p>Loading and discharge of processed hot mix:</p> | <p>The BAGELA mixing drum has no hydraulics to lower or lift the drum for discharging. Processed mix is discharged by dropping through a grate at the opposite end from loading where it is allowed to pile up on the ground beneath the machine. Because of BAGELA's design, the bucket of a wheel loader cannot entirely reach underneath the machine to receive discharged hot mix, unless the machine is raised by jacks at the discharge-end or placed on an elevated embankment. When used for mobile purposes, the jacks must either be repeatedly lowered and raised as the machine is relocated to each successive repair or the discharged hot mix is dropped to the ground where it must, then, be scooped up with a wheel loader, unless it is dropped directly into the waiting application beneath the machine.</p> <p>Thus, the typical arrangement for the operation of a BAGELA is from an elevated, stationary position (which poses safety issues); typically, on an embankment or elevated platform (oftentimes with steps and an adjacent ramp, which also pose safety issues).</p> <p>Still from the elevated position of the BAGELA, the discharged hot mix is typically dropped to the ground and, then, scooped up by a second wheel-loader. A steel backstop (furnished by BAGELA with the purchase of their machine) is required to push the material up against to get the material into the bucket of the wheel-loader to avoid pushing some of the</p> | <p>By hydraulics, the RENOVA hopper lifts and dumps the loaded material to be processed directly into the mixing drum. The RENOVA drum assembly hydraulically rotates, reverses, lowers and raises until the desired angle is achieved to discharge all or as much as needed of the hot mix that has been produced directly into the waiting application or into a skid steer bucket, bobcat, or wheel barrow to be dispensed into the repair area. Some RENOVA owners especially like to tilt the drum and stop its rotation to where a crew can use a shovel to retrieve hot mix at chest-height and transfer it via shovel to the repair. These advantages of the RENOVA, enable the operator to achieve and maintain the highest possible mix temperature at 330°F- 350°F which elevates repair quality.</p> |

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|          | <p>material up under the machine. This discharged asphalt backstop is accompanied by elevated supports designed by BAGELA to withstand a front-end loader bucket impacting the backstop at its bottom edge. Thus, two-wheel loaders and two operators for the wheel loaders are required – one for loading the machine and one for scooping up the discharged hot mix.</p> <p>As indicated, the processed hot mix drops from the BAGELA grate (cooling as it drops through the air) and accumulates on the ground and, as it waits to be transferred from wheel-loader to hot box or truck bed, there is significant heat loss which compromises the quality of the asphalt repair. Especially in wintertime, when the ground and air is cold, the thermal heat within the hot mix is sucked out of the asphalt as it drops from the machine and as it sits in the accumulating pile of asphalt. The hot mix may be transferred to a hot box where the material can be reheated to optimum temperature and transported to the location of the needed repair.</p> <p>The above issues detrimentally impact BAGELA’s stated production rate and the quality of hot mix produced.</p> <p>For the above reasons, and many others addressed herein, BAGELA is not the most practical recycler to use for mobile at-repair-site purposes.</p> | <p>RENOVA technology has none of these issues, and, RENOVA is a hot box of itself; thus, greatly advantaging its user.</p> |

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| Processing millings & chunks | <p>Processing ground millings and chunks of asphalt in a continuous-feed recycler requires that each product type be treated differently. A single mixing drum in the BAGELA is not designed for both millings and asphalt chunks. BAGELA manufactures a distinct mixing drum appropriate for processing millings and another drum for processing chunks of asphalt, which means the user, when acquiring a BAGELA, must specify the use to which the BAGELA machine is to be employed – for millings or for chunks of asphalt. The user of this technology must understand the difference and must acquire the appropriate machine. In late 2017, a North American city, for example, used their BAGELA machine meant for processing millings to process chunks of asphalt. The result was that the interior of their drum was severely damaged, including warping of the drum. They ordered another drum from BAGELA. It took 6-months to receive the new drum and when it arrived the drum was out-of-round. Conversely, BAGELA mixing drums designed to process chunks of asphalt, rather than millings, allow millings to pass through the process too quickly and, oftentimes, millings don't get processed appropriately. Ultimately, the user of BAGELA technology must use one BAGELA drum for millings and another for chunks.</p> <p>The largest-sized chunks permitted into the BAGELA are 15-inches. Anything larger must be broken up before placing into the</p> | <p>RENOVA has no issue with the state or type of the asphalt material; whether that be millings, chunks of asphalt, excess asphalt or “asphalt cookies,” or all of these asphalt products mix together.</p> <p>RENOVA accepts 24-inch by 6-inch thick by 72-inch in length chunks through its 27-inch machine opening. RENOVA's batch process allows the operator to retain any</p> |

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|                     | <p>BAGELA; thus, impacting BAGELA's stated production rate. Because the BAGELA builds up residue at its entrance, the throat of the entry can become constricted; thereby further limiting the size of chunks that can be entered into its chambers. BAGELA is sold with a long heavy steel bar and there is a port hole in the throat of the machine through which the bar can be inserted to gain leverage in dislodging any large chunks of asphalt which may become lodged in the throat of the machine. This can be a serious impediment to the proficiency of the BAGELA process, thus, jeopardizing its production goals. In an emergency, such as with bombed-out airstrips, this could be a critical issue.</p> <p>A safety issue is raised by some BAGELA operators who point out the danger of a chunk of asphalt falling from the hopper at the top of the machine onto bystanders on the opposite side of the machine as the hopper is loaded.</p> | <p>of the previous products or all of them together in the mixing drum as long as necessary to achieve the desired results before the product is discharged. RENOVA's robust construction, with AR steel, ¼ inch steel flighting and baffles welded into the inside diameter of the drum provide the structural strength required to withstand the weight of the largest chunks of asphalt.</p> |
| Traveling with mix: | <p>Traveling to a repair site loaded with mix is often practical. The transportability of previously processed left-over mix and the ability to reheat that mix is of vital concern as the recycler moves from repair to repair. However, with the BAGELA and its continuous-feed process, it is not practical to travel with the machine loaded. Theoretically, the machine could travel with one load aboard, but processing a full load in the BAGELA machine is not conducive to generating well-processed hot mix. Traveling with the hopper</p>   | <p>With the RENOVA, an operator can arrive at a site with 2 tons of material, the material stored on board can be reheated and remixed and dispensed at will into a frontend loader bucket or directly into a pothole or repair site. Some users prefer to tilt the drum to where crews can capture a shovel-full of hot mix and, then, deliver it to the repair.</p>                           |

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|  | of the BAGELA full of material would pose a safety issue.   |  |
| Overheating mix prevention                   | The BAGELA production process requires constant monitoring and manual adjustment to avoid overheating the mix and the possibilities of catching mix on fire which can result in flames from both ends of the machine. While overheat protection exists, the operator of the BAGELA must have experience in the complexities of the technology to avoid fire. Due to the closed chambers, if a fire occurs, it is internal and must be extinguished by loading more material or stone into the drum (it it's available) and suffocating the fire out.  | A temperature sensor with a digital display allows even the most inexperienced operator of the RENOVA to set the maximum temperature; for example, 350°F, at which point the burner shuts off automatically when an excessive mix temperature is sensed – to enable the operator to avoid overheating the mix. Any system fault automatically shuts down the system and illuminates a visual fault indicator. In the event of any fire within the RENOVA, the mix and fire within the drum can be quickly dumped to the ground. Sometimes, the safety of operator and workmen involved becomes more important than production goals.   |
| Raising discharge temperature/re-heating mix | Operators often need to raise discharge temperature. Also, it is, at times, advantageous to reheat hot mix that has been produced since it loses temperature and can drop to levels where the asphalt starts to cool and set up. The BAGELA produces hot mix and drops it onto the ground for loading, often at temperatures less than 300°F by the time the product has accumulated. With a BAGELA, the primary way to reheat that mix to, say, a desirable 330°F is to reload the discharged mix back into the recycler and reprocess it. If no hot box is available (or recycler to act as a hot box) then this method of reheating is first choice. A second choice keeps mix in the drum, however users trying to maintain hot temperatures of mix have actually caused greater problems. BAGELA owners report incidences in which | RENOVA has the flexibility of reheating left over hot mix in the machine with little risk of overheating. This is achieved by lowering the burner and running it for 2 to 4 minutes to raise the mix temperature back up over 300°F. Thus, the RENOVA operator may travel to the next repair keeping unused mix in the hot drum at optimum temperature. RENOVA functions as a hot box. RENOVA has an added protection against overheating with its potentiometer dial control that links to the burner contacts permitting the operator to set a point at which the burner turns off automatically to avoid overheating of the asphalt material. Even the most inexperienced operator can set the maximum temperature, for example, 350°F, at which point the burner shuts off automatically, preventing the operator from overheating the mix. However, as indicated previously, in the event of fire, it is easier to monitor and control with the RENOVA as the mix and fire can be |

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|  | they have tried to raise the temperature of their mix in the drum; either causing a fire and/or risking damage to the drum.  | quickly dumped to the ground. Sometime, safety is as important, if not more so, than production.  |
| Need to dry out wet millings:  | Stockpiled asphalt millings and RAP often get wet. When moisture content is higher, more heating time is required. With BAGELA's continuous process, the operators' ability to reheat wet millings to dry them is limited.   | RENOVA's operational flexibility permits running heat for longer periods to dry out wet millings without the danger of combustibility. Single-batch processing facilitates a little longer mix-heating period. Simply keep the mix in the drum and heat for 2 to 4 minutes until the moisture is removed, and, then, proceed with the usual process. RENOVA's batch process enables its operator to adjust to varying time and temperature requirements dictated by the starting ingredients' moisture content, density and quantity. |
| Access to mix in process (to check quality and/or to add rejuvenator/additives): | It is important for the operator to be able to monitor and assess the quality of the product while it is in the process of production; to actually remove some of the product to view it and measure its temperature - to test it. The BAGELA operator has no access to mix being processed until the material is discharged through its grate because of BAGELA's closed drum and continuous process. The process is cumbersome, as the operator must stop the recycler, reverse drum direction, push in a lever that catches against a tab on a steel sliding gate to open the drum, and then the drum must revolve so that the mix can spill out for the operator to check the hot mix for proper heat. If the hot mix is not optimally heated, it contaminates the asphalt pile below. The drum is then reversed to close the grate and the heating process continues. | The RENOVA operator can adjust additives by inputting them at any time during the process as well measure temperature of the actual mix at any time in the process.   |

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|   | <p>Rejuvenators and additives must be placed in the hopper of the BAGELA with the material to be processed before the material enters the machine. Otherwise, because of the continuous process, there is no way to spread the additive evenly.</p>  |  |
| <p>Discharge of hot mix produced:</p>   | <p>BAGELA specs suggest material is loaded into the front of their recycler by a hydraulically operated hopper and to discharge the resulting hot mix at the rear of the recycler.</p> <p>BAGELA’s loading takes place at the top of the machine where it is dropped into the throat of the machine from the hopper. Because of the design of the BAGELA, its processed hot mix is discharged to the ground wherein additional inefficiencies of process, contamination and cooling of the product occur; thus, affecting the quality of the resulting hot mix produced.</p> <p>With experience, the BAGELA operator knows mix is ready by watching the exhaust coming from the feed side. Initially there is dust as the heat takes dust airborne, then steam as the moisture evaporates, then the white steam becomes clear heat, and at this point the discharge temperature has likely been reached, after which the color turns yellow (overheating) and then black (fire).</p> | <p>Material is loaded into the RENOVA into the rear of the recycler by a hydraulically operated hopper and discharged hydraulically through the rear of the mixing drum of the recycler. RENOVA can load in less time than the BAGELA since it loads in half the time by being able to install 2-tons per load vs. 1-ton with the BAGELA. The RENOVA operator is able to maintain hot mix at the optimum temperature since this is a batch process in which all the material is processed together and discharged in mass (not on the ground) where it is able to retain its maximum heat as a single congregated body of hot mix. RENOVA discharges at the same end as loading by tilting up the drum assembly frame until the desired angle is achieved by the operator. The open-end arrangement permits discharging directly into a front-end loader, skid steer, bobcat loader, wheel barrow or directly into the repair area itself. Unlike the discharge process of the BAGELA wherein the mix streams from the grate of the drum, RENOVA has the advantage of hydraulics. The drum assembly lowers the discharged hot mix to the level of the loader bucket (or directly into the waiting application) and the material slides out in mass wherein it retains maximum heat required for optimum compaction of any repair to be made.</p> |
| <p>BAGELA recycles asphalt using convection type heating, stating their burner flame does not come in</p> | <p>BAGELA is the only major mobile asphalt recycler that claims to employ “convective heating,” and they extol the virtues of “heating</p>   | <p>RENOVA deploys direct-fire, no-contact heating methodology, leveraging radiative heat energy from the burner flame. Heat transfer is accomplished by the a highly</p>   |

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| <p>direct contact with the material inside the mixing drum:</p> | <p>indirectly by convection.” Yet their burner fires directly into the drum, similar to RENOVA, heating from the discharge end of the drum. BAGELA’s claim, rather, is more of an artful deception. The fact is that hot boxes are heated indirectly – the BAGELA is not a hot box and is not heated indirectly. For example, the Stepp SRM-10-120 hot box employs indirect fire as heat passes through a steel liner. BAGELA’s burner heats directly; similar to RENOVA, with no contact with the mix contained within.</p> <p>As stated in BAGELA’s patent application, “...the material is heated up by radiant heat, but mainly by the hot wall of the mixing drum.” BAGELA’s process, however, provides little opportunity to adjust machine operation for individual needs such as holding and reheating mix or heating out moisture.</p> <p>BAGELA claims (wrongly and deceptively) that the RENOVA direct fire technology burns asphalt rendering it low in quality. Modern hot plant manufacturers (Stansteel, Astec, BDM, Amman) endorse and promote radiative heat as a highly efficient form of heat transfer in the heating of reclaimed asphalt pavement. They observe that it follows logically that if the heat energy of a flame must be transferred through a medium like oil, then BTU’s are lost in the multiple transfer: flame-to-metal, metal-to-oil, oil-to-metal and metal-to-millings. In fact, one manufacturer, Amman of Switzerland, in their hot plant design uses</p> | <p>efficient form of heat transfer possible - radiative heat. Drum contents do not have direct contact with the burner flame. (See center photograph, Capability Statement, or video on website: <a href="http://www.RenovaIndustries.com">www.RenovaIndustries.com</a>) There is no danger of burning or scorching of the material in the drum. Burning off AC content in material being processed would require sustained heat to the entire mass for more than 350°F for an extended period. (This is similar to the BAGELA – the operator can determine at what stage of heating the material is at by looking at the exhaust gas plume, just as with BAGELA...dust, then steam, then yellow, then black.) The lighting in the mixing drum directs the flow of material being processed toward the rear of the drum and as the material reaches the 9 to 11 o’clock position of the circumference of the drum (hugging the side of the rotating drum as it is directed to the rear by the lighting) it travels away from the flame which is located at the entrance of the mixing drum until at the 11 to 12 o’clock position the material cascades down the inside perimeter of the drum where, at the 12:00 position, it falls to the bottom of the drum well beyond the flame - completely avoiding the flame. The drum has internal baffles to create shear mixing of material. The old material is properly heated and mixed in quantities desired with mix temperature maintained at optimum level throughout the entire process. Ultimately, the evidence of RENOVA’s ability to process old material with maximum heat transfer achieved without flame-mix contact and consequent burning or scorching of the product is in the exceptional quality of the hot mix produced and in the durability of the resulting repair.</p> |

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|   | <p>convection for drying and radiative for heating. They use radiative heat for their larger asphalt recyclers.</p> <p>The foundation of BAGELA’s technology, business model and financial strength is based on the proclaimed “convection heating design” of their machine. To maintain credibility, and to discredit their competition, they arduously promote their technology and wrongly disparage the newer American-made RENOVA and KM recyclers by making bold and false statements suggesting these newer technologies overheat product and burn off AC content.</p>   |   |
| <p>US Military Users of the Technology/Quick Recovery of Bombed Out Airstrips</p> | <p>For the military, mobility of the recycler is critical to efficiency and speed of repair. Bombed-out airstrips will have craters scattered everywhere; requiring repeated relocations and re-mobilizations of the recycler and any required auxiliary equipment. Cumbersome impediments make the BAGELA inefficient as a solution for the quick recovery of bombed out airstrips. An additional issue for the military is that the BAGELA machine is complicated and experience is required to master its technology. The rate of turnover in the military is inordinately high and, therefore, re-training is a constant.</p> <p>However, for several years now, with no other viable alternative, BAGELA has been the technology employed by the USAF for RADR applications.</p> | <p>For the quick recovery of bombed-out airstrips, efficient repetitious relocations and re-mobilizations from one crater to the next are crucial to the speed of repair. Fully hydraulic, with the ability to load near ground level and to dispense hot mix directly into the waiting application, the RENOVA requires the assistance of only a skid steer to load. The RENOVA provides an efficient, maneuverable system <u>for quick recovery of bombed out airfield repairs with no impediments to its proficiency; ultimately providing a higher effective production rate than BAGELA.</u> For the military, rotating crews can be quickly trained on the user-friendly RENOVA system which is simpler to operate.</p> <p>Recently, independently and without any bias or predispositions, the US NAVY and the US Marine Corps analyzed the disparities between BAGELA and RENOVA; and both agencies have declared RENOVA to be the more appropriate recycling technology for rapid airfield damage recovery, as well as for Base maintenance.</p> |

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| Peak production capacity is proclaimed to be 10-tons per hour.   | Proclaimed output approximates 1-ton of recycled mix every six (6) minutes (under ideal conditions). Realistically, the numerous variables mentioned previously and BAGELA's inefficiencies of process and the mechanics of the machine itself affect its output dramatically. Accordingly, BAGELA rarely attains its proclaimed rate of production. | Same results, but the division is different in that the RENOVA has an output of 2-tons of recycled mix every twelve (12) minutes (ideal conditions assumed). Subject to the variables mentioned in the opening remarks of this "Comparison" document (page 1) affecting "peak" production rates, and assuming ideal conditions, the RENOVA machine typically produces from 8 to 9 tons of hot mix per hour. |
| <b>ENGINE</b>  |  |   |
| 3-cylinder, 25 horsepower water cooled direct-injected diesel engine.  |  | 3-cylinder, 26 horsepower Kohler Diesel engine (PA-KDW1003-1501).   |
| 85 cubic inch displacement.  |  | 62.7 in3 (1028cc)   |
| Engine conforms to current EPA emission standards.   |  | Similar   |
| <p>Engine is equipped with the following but not limited to:</p> <ul style="list-style-type: none"> <li>• Single element, dry type air cleaner</li> <li>• Spin-on type oil filter</li> <li>• Cartridge type fuel filter</li> </ul>   |  | Similar (The RENOVA engine meets tier 4 emission requirements and is UL certified.)   |
| <b>ELECTRICAL SYSTEM</b>   |  |   |
| <p>The electrical system has the following but is not limited to:</p> <ul style="list-style-type: none"> <li>• 12-volt kW starting motor</li> <li>• 12-volt 40-amp alternator</li> <li>• 12-volt maintenance free battery</li> </ul> |  | Similar   |
| <b>HYDRAULIC SYSTEM</b>  |  |   |
| Recycler has an engine driven gear pump to generate hydraulic flow.  | The hopper on the BAGELA operates hydraulically and there is a pressure gauge on the hydraulic system control panel telling the operator the Bar Pressure, which equates to how much (weight) is in the drum. All controls are European standard. The drum speed and rotation direction are also hydraulic.  | As indicated previously, by hydraulics, the RENOVA hopper lifts and dumps the loaded material to be processed directly into the mixing drum. The RENOVA drum assembly hydraulically rotates, reverses, lowers (and raises) until the desired angle is achieved to discharge all or as much as needed of the hot mix that has been produced directly into the waiting application or into a skid             |

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|   |  | steer bucket, bobcat, or wheel barrow to be dispensed into the repair area. The RENOVA burner lifts and stores and lowers into position by hydraulics. All parts and components are American made and readily available.  |
| <p>Hydraulic system includes the following:</p> <ul style="list-style-type: none"> <li>• Control valves</li> <li>• Pressure gauges</li> <li>• Return flow filters</li> <li>• Piping &amp; flexible hoses</li> </ul> |  | Similar   |
| Covers are removable to access all hydraulic component and hoses.   |  | No removable access is required with the RENOVA. Hydraulic components and hoses are fully accessible.   |
| <b>HEATING SYSTEM</b>   |  |   |
| The diesel burner has a capacity of no less than 400 kW.  |  | Capacity of the RENOVA burner is 1.4 million BTU (410 kW). The RENOVA burner is UL certified.   |
| Burner system is located at the rear of the unit.   |  | Similar   |
| Burner operations are controlled at the operator's station.   |  | Similar   |
| Similar   |  | RENOVA does not use multiple burners for a simpler operation with less moving parts and less to maintain. One stage of heat is sufficient. If less is requested, the burner can be turned down to 50% output.   |
| BAGELA burner has an automatic shutdown system when sensing any faults.   |  | Any system fault automatically shuts down the system and illuminates a visual fault indicator at the operator control.  |
| Temperature of recycled material is controlled by the operator.   | Operator cannot check actual temperature of the in-drum mix itself during processing in BAGELA's continuous-feed design. | RENOVA has a temperature sensor with a digital display that allows even the most inexperienced operator to set the maximum temperature, for example 350 degrees, at which point the burner shuts off automatically to avoid overheating the mix. Or, mix temperature can be checked |

| CATEGORY  | BAGELA REALITY & ISSUES  | RENOVA SOLUTIONS   |
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|   |  | any time during operation of a RENOVA with a handheld infrared temperature gun.  |
| <b>DRUM</b>   |  |  |
| BAGELA's drum is hydraulically chain driven for continuous rotation.  | Chain drives are prone to requiring more maintenance than hydraulic motors. Chains lose and gain tension causing required adjustments. They break, requiring replacement. They need lubrication.   | RENOVA's enclosed gear drive and hydraulic motor have none of these requirements.  |
| BAGELA's chain drive is easily accessible for the operator to adjust.   |  | This requirement underscores the previous point that chain drives vs. gear drives require regular servicing and, therefore, need access for operators to adjust the chain. No such requirement applies to the RENOVA gear drive.           |
| BAGELA's chain drive is enclosed for safety.  | Even with enclosure, risks exist with chain drives as operation can start as a servicer is in position to be caught up in its operation.   | This is a physical impossibility with gear drives, as in the RENOVA design.  |
| BAGELA's Drum rotation speed is between:<br>• 7 rpm's and 14 rpm's  |  | RENOVA achieves complete turbulence of the mix at once – permitting slower speeds of 2, 5 and 9 RPM.   |
| Drum rotation speeds:<br>• 2-forward<br>• 1-reverse   |  | The RENOVA drum has 3 speeds in forward and 3 speeds in reverse making it 6 speeds over the BAGELA's 3 speeds.   |
| Loading of material in the BAGELA is done mechanically with the aid of a hydraulically operated top loading hopper. | The BAGELA design does not provide total control of loading speed to the operator. Material entry into the throat of the BAGELA must be managed in increments to avoid clogging, obstructing and impeding continuous entry of product into the process. The entire product in the hopper cannot be introduced at one time. | RENOVA's loading is achieved via gravity through the hopper and its chute into the drum yet the "double-jointed" hopper has a horizontal tilt-out function giving its operator total control over how much mix hits the drum at what pace. |
| BAGELA states its Drum is self-unloading.   |  | With a RENOVA, the operator can discharge as much or as little as the operator chooses.  |
| BAGELA's housing is fully insulated.  | Because convection has lower heat transfer efficiency, insulation is required.   | The RENOVA higher heat transfer using radiative heat negates the need for insulation.  |
| <b>BODY</b>   |  |  |

| CATEGORY   | BAGELA REALITY & ISSUES | RENOVA SOLUTIONS   |
|--|-------------------------|--|
| BAGELA's body is welded steel construction and equipped with: <ul style="list-style-type: none"> <li>• Lifting hooks</li> <li>• Quick release access panels</li> </ul>   |                         | Similar  |
| BAGELA's trailer has the following approximate dimensions: <ul style="list-style-type: none"> <li>• Length: 22'</li> <li>• Width: 7½'</li> <li>• Height: 8'</li> <li>• Weight of machine &amp; trailer: 11,000 lbs.</li> </ul> |                         | RENOVA's tri-axle trailer dimensions are: <ul style="list-style-type: none"> <li>• Length: 22'</li> <li>• Width: 8' - 7"</li> <li>• Height: 8' - 4"</li> <li>• Weight of machine &amp; trailer: 13,200 lbs.</li> </ul> |
| <b>TRAILER</b>   |                         |  |
| BAGELA's trailer is a tandem axle design with an axle capacity rating of approximately 6,600 lbs. per axle.  |                         | RENOVA has a more robust tri-axle trailer with each axle rated at 7,000 lbs. The advantage this provides RENOVA is in its stability and its ability to travel fully loaded with mix to the site of the needed repair.  |
| The tongue height is adjustable and equipped with a 3" i.d. pintle hook.   |                         | Similar  |
| Two (2) hi-test ¾" safety chains with safety hooks.  |                         | Similar  |
| Trailer plug is 7-prong round pin, 48" long and wired per SAE code J506B (See Specifications: 7PTC).   |                         | Similar  |
| BAGELA frame is constructed of heavy-duty wall steel.  |                         | Similar  |
| BAGELA is supported by two (2) drop down heavy-duty parking jacks that are sufficiently rated by the manufacturer for the specified unit.  |                         | Similar  |
| Multi-leaf spring suspension.  |                         | Similar  |
| Tires are 7.50 R16 LT.   |                         | Tri-axle, ST235/80R16  |

| CATEGORY   | BAGELA REALITY & ISSUES              | RENOVA SOLUTIONS   |
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| D.O.T. approved reflectors and red/white conspicuity striping.   |                                      | Similar  |
| Led lights, license plate bracket with light, and a Grote Model 43901 or approved equivalent documentation holder securely mounted to frame.   |                                      | Similar  |
| <b>CAPACITIES</b>  |                                      |  |
| Fuel tank: 18-gallons.   |                                      | RENOVA deploys one 91-gallon tank serving both engine and burner   |
| Burner fuel tank: 55-gallons.  |                                      | 91-gallon tank serves both the Burner and the Fuel tank.   |
| Hydraulic oil: 40-gallons.   |                                      | 30 GALLONS   |
| <b>OPERATORS STATION</b>   |                                      |  |
| Engine control panel includes the following: <ul style="list-style-type: none"> <li>• Keyed ignition</li> <li>• Engine oil light</li> <li>• Battery control light</li> <li>• Hour meter</li> </ul>   |                                      | Similar  |
| Operators station is equipped with the following: <ul style="list-style-type: none"> <li>• Drum rotation lever</li> <li>• Drum speed control lever</li> <li>• Hydraulic top hopper control lever</li> <li>• Drum open/close lever</li> </ul> |                                      | Operator station is equipped with the following: <ul style="list-style-type: none"> <li>• Drum rotation lever</li> <li>• Drum speed control</li> <li>• Hydraulic hopper control</li> <li>• Burner hydraulic Lower/Lift in place</li> </ul> |
| Control panel includes: <ul style="list-style-type: none"> <li>• Burner controls</li> <li>• Hydraulic pressure gauge</li> <li>• Electronic temperature gauge</li> <li>• Burner pressure and suction gauges</li> </ul>                        | BAGELA gauges are European standard. | USA Standards  |
| <b>PAINT</b>   |                                      |  |
| Manufacturers standard.  |                                      | Similar  |

| CATEGORY   | BAGELA REALITY & ISSUES | RENOVA SOLUTIONS |
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| <b>MANUALS</b>   |                         |                  |
| BAGELA manuals supplied upon delivery:<br>Operating-2, Parts-1 |                         | Similar          |

### Features Comparison

| FEATURE                          | BAGELA  | RENOVA  |
|----------------------------------|---|---|
| Accessory electrical receptacles | BAGELA <u>has no</u> accessory electrical receptacles.  | RENOVA has accessory electrical receptacles on board for assorted tasks including optimum night lighting for illumination at the material load, discharge and operating control locations or to illuminate the area being repaired.   |
| Digital weight indicator         | As indicated previously, BAGELA has a pressure gauge on the hydraulic system control panel that tells the operator the Bar Pressure, which equates to how much (weight) is in the drum. | RENOVA's digital weight indicator (Vulcan V320 Scale System/Weight gauge) on the drum supports, uses a highly-accurate strain gauge sensing technology, allowing the operator to know the exact amount of material that has been placed into the drum and to calculate the proper ratio of additive required to rejuvenate the depleted asphalt cement content contained within the old material being recycled.  |
| Digital temperature sensor       | BAGELA <u>has</u> a device which shuts off automatically when an excessive drum shell temperature is sensed.  | RENOVA has a potentiometer dial control that links to the burner contacts permitting the operator to set a point at which the burner turns off automatically to avoid overheating of the asphalt material. Even the most inexperienced operator can set the maximum temperature, for example, 350°, at which point the burner shuts off automatically, preventing the operator from overheating the mix. RENOVA also has a temperature sensor with a digital display at the control panel that provides relative/indicative temperature of the mix. |

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| Deep cell battery   | BAGELA <u>has</u> a deep cell battery.  | RENOVA is equipped with a deep cell battery with disconnect to shut off power to the unit to avoid a power drain during off periods to extend the run time and lifetime of its battery.   |
| Weatherproof, lockable NEMA 4 box electrical cabinet            | BAGELA <u>does not have</u> this feature.   | All RENOVA electrical component controls are housed in a weatherproof, lockable NEMA 4 box house cabinet.   |
| Rejuvenator and ability to achieve high quality hot asphalt mix | BAGELA owners utilize assorted “rejuvenator” products including vegetable oils, Crisco oil, pine oils, resins, greases, and wax beads, none of which add asphalt cement to the process – the one essential ingredient crucial to the rejuvenation of the binding qualities required of the recycled material. High-rubber content pellets containing minimal AC have gained some traction with BAGELA owners. However, rubber pellets don’t contain enough AC and they have too high of a concentration of crumb rubber which results in a stiff mix that often causes balling and unraveling of aggregate in the repair, in addition to making the resulting hot mix stiff and difficult to work with. The BAGELA continuous process does not permit homogeneous mixing of additive and rejuvenator. The additive is typically fed slowly into the inlet side where it travels across the length of the cylindrical drum to its exit. A challenge with the BAGELA is getting the additive to mix homogeneously. Typically, the additive melts as it moves through the drum and only partially mixes with that which is in front of or behind the location where the additive was introduced into the drum. Experienced operators with the BAGELA have remedied this issue to some extent by broadcasting additive across the length of a frontend loader bucket of RAP, if it is a liquid or pelletized type product. Then, the bucket of RAP is lifted to the hopper and dumped in, where it is then fed into the | Perhaps the most critical component determining the quality in the renewal process is the rejuvenator added to each batch of mix. RENOVA achieves high quality hot mix every time by the addition of an exclusive rejuvenator, the industry’s only additive containing asphalt cement, crumb rubber and softeners, specifically formulated and manufactured for use in asphalt recycling machines to assure production of the highest quality hot mix possible. The asphalt cement in the product (approximately 80%) virgin liquid asphalt cement restores the depleted AC in the old material. The crumb rubber component (approximately 12%) elevates the quality of HMA by restoring the elasticity, resilience and binding qualities of the old material being processed. Softeners in the rejuvenator are an essential ingredient which allow the old material to release the depleted AC from the aggregate in the old material being processed; thus, permitting new AC to merge with the old aggregate. Simply processing old material without an additive that contains these softeners results in a stiff hot mix that is difficult to work with. The resulting hot mix provides for better compaction; thus, increasing density which prevents the penetration of moisture into the repair, ensuring the integrity of the sub-base. The rejuvenator is an exclusive RENOVA product that no one else has or can duplicate. The rejuvenator is semi-solid and comes in the form of one-pound and 2.5-pound packages encased in dissolvable plastic for insertion into the mix during the recycling process. The RENOVA drum batch design allows a homogeneous mixing of the |

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|   | BAGELA with the hope that, as it travels through the drum, it will mix adequately.  | additive/rejuvenator. Like a cement mixer, the drum of the RENOVA with its dual hydraulic lifts has the advantage of being able to tilt up and down with the drum turning. This action provides thorough mixing. A solid rejuvenator tossed into the RENOVA will mix throughout the batch. RENOVA's time and temperature flexibility also accommodates multiple rejuvenator options not possible with the BAGELA.   |
| Ability to convert 100% RAP into Cold Mix | BAGELA's continuous process prohibits this machine's ability to process RAP into Cold Mix.  | RENOVA is the only asphalt recycler that can convert 100% RAP into cold mix by adding another innovative and exclusive RENOVA product. For the first time ever, RENOVA provides the opportunity to not only recycle old, used asphalt, but, with a RENOVA, one now can manufacture cold mix (cold patch) from RAP. Introducing this product to RAP is possible only with a batch process recycler. BAGELA cannot do this.   |
| Functionality                             | German made, with foreign components, BAGELA attempts to imitate the operation of an asphalt plant. Because of BAGELA's closed drum chambers and its continuous process, the material contained within the drum is inaccessible during the process. The operator is unable to monitor the quality of the hot mix until it has been discharged. BAGELA's trickle discharge process allows the hot mix to cool as it is dropping from the discharge grate to the ground and, as the piling up process is drawn out, the slowly accumulating pile of asphalt continues to cool down. Add to these issues the necessity to remobilize accessory equipment and manpower from each repair to the next and, ultimately, these additional requirements consume valuable time which negates any advantage BAGELA may have in its stand-alone proclaimed production rate 10 tons per hour. Processed hot mix in the BAGELA cannot be retained in the machine to be reheated later. It must be discharged and placed into a hot box, if it is to be kept at optimal temperature. | RENOVA - Simple, user-friendly, straightforward functionality, and American-made with American components. In the process of recycling asphalt, it is important that the operator view and assess the quality of the hot mix being produced. With the RENOVA, the operator can constantly access and view the mix in process and, accordingly, if needed, can add additional rejuvenator into the process to produce a better quality hot mix. The RENOVA operator merely reverses drum rotation to bring the mix toward the nose of the drum (27-inch opening) to remove a shovel-load of mix for inspection. The RENOVA operator can maintain hot mix at the optimum temperature since this is a batch process in which all the material is processed together and discharged in mass where it is able to retain its maximum heat as a single congregated body of hot mix. RENOVA discharges at the same end as loading by tilting up the drum assembly frame until the desired angle is achieved by the operator. The open-end arrangement permits discharging directly into a front-end loader, skid steer, Bobcat loader, wheel barrow or directly into the repair area itself. Unlike the |

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|                |   | <p>discharge process of the BAGELA wherein the mix streams from the grate of the drum, RENOVA has the advantage of hydraulics which allows the hot mix to slide out in mass, retaining optimum temperature for ideal application. RENOVA is capable of holding hot asphalt mix in the nose of the non-rotating (stopped) drum for by-shovel load discharge to the point of a repair, if desired. Also, if the operator of the RENOVA wishes to retain processed hot mix in the machine to be reheated later, it is a simple matter of reheating the mix that has cooled. As indicated previously, the RENOVA operator may travel with cooled mix and reheat as desired. This can't be done with the BAGELA.</p> |
| Serviceability | <p>Cleaning and servicing the mixing drum of the BAGELA is a challenge due to the closed design of the machine. Obtaining parts and making repairs such as those mentioned previously wherein there were issues with the mixing drum of the BAGELA which had to be secured from Germany can present a serious challenge as well as an extended delay in the ability to get the machine back in service.</p> | <p>RENOVA has minimal moving parts, American-made parts and components readily available, and the simplest of controls. Maintenance requirements are minimal. Cleaning or removing residual deposits from the interior of the RENOVA mixing drum is a simple matter of loading 1/2 inch to 1-inch stone, tumbling at 300°F for 20 to 30 minutes wherein all residual material adheres to the stone, leaving the steel inner shell and flighting clean. No tools, no chamber entry, no cleaners and no excessive man-hours required.</p>   |