





UPDATE your PLANT with MARINI recycling LINE.... and INCREASE your PROFITABILITY and ECOLOGY

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HOT RECYCLING

CHARACTERISTICS

Using recycling materials to produce an asphalt mixture is advantageous both from an environmental point of view because materials are reused and from an economic point of view because raw material costs are reduced.

Maximum 35 - 40% recycling material can be used in a hot recycling line. A hot recycling line is normally composed of the following main parts:

- No.1 Cold feeder
- Conveyor belt
- Optional scalping screen
- Optional bucket elevator
- Recycling ring

BENEFITS COMING FROM THE USE OF RECYCLING MATERIALS

Using recovered material brings the following benefits:

- Obtaining a mix whose characteristics are equivalent or even better than the classic mix produced with virgin materials excavated from quarries and never used before at a much lower price and hence cost to the entire community!
- Reducing the virgin material excavation activities and hence soil erosion whether the quarry be near or far.
- Reducing vehicle traffic for transporting the virgin material, often from faraway quarries, and hence fewer expenses, less pollution and less damage to roads caused by heavy vehicles!
- Recovering materials commonly considered as "waste", especially when coming from areas in proximity of the construction site, allows immediately reusing "resources" that otherwise would need to be handled as waste and would hence involve high disposal or storage costs to the community.

Going into more detail, the primary recycling material in a plant consists of the broken-up pieces of asphalt resulting from road surface milling.

This material, appropriately pre-crushed according to specifications relating to its core composition of aggregates and bitumen, can be hot recycled in the recycling ring located at the terminal part of the dryer drum or cold recycled in the mixer.

According to legislation, this material may be deemed a product suitable for use in the production process of a bituminous mixture.



Recycling asphalt brings the following benefits:

- Reusing a high percentage of bitumen already present in the road crust with consequent saving not only in terms of new bitumen to be added to the mix, but also less pollution connected with the production process, transport and storage of the new refinery bitumen.
- The milled material will already have undergone a stone extraction and sorting process, therefore, depending on the various layers milled, you can be reasonably sure that after the appropriate laboratory tests, you have a material of high quality and homogeneity.

HOT RECYCLING MATERIALS FEEDIND THROUGHT THE RECYCLING RING

A specially designed ring allows feeding the milled or subsequently granulated and resorted materials into the most suitable area of the dryer drum without infiltration of cold air.

The material introduced does not come into direct contact with the hot flame gases, but is heated in "heat recovery" shovels and mixed with virgin inert materials already partially heated to the most suitable temperature.

That way, the recycling material is gradually heated reducing the risks of bitumen degeneration, while remixing with the virgin materials prevents the formation of agglomerations that would cause problems in the subsequent process phases.

There are no particular rules for what type of road or asphalt can be produced with the use of milled material, as using it in high percentages entails having to treat it in a separate crushing and screening plant; a laboratory also needs to analyse the type of milled material reused and indicate to the end customer (based on the starting material and the asphalt to be produced) the quality and quantity of bitumen to be integrated, the aggregates required to correct the formula and any additives to be added.

It is essential that the milled material be divided according to the layer in which it will be used and also that it be covered during storage in order to keep the moisture very low and increase the percentage technically useable.

Of course, the general rule is that maximum percentages of milled material can be used for base courses, but only small percentages for the surface course and only after careful laboratory analysis.

Although current specifications often impose using not more than 30% of milled material, the recycling ring solution allows reaching percentages as high as 35-40%.





From the technical point of view, the milled material used in the ring may not have more than 35% undersized particles passing through a 0.5mm mesh.



Synoptic diagram of recycling ring



MILLED MATERIAL HANDLING

The hot recycling operating system requires handling the recycling material using a conveyor belt and bucket elevator if necessary.

A mill screen can also be installed to sort the material to be conveyed to the ring.

The milled material is moved from the cold feeders to the recycling ring by means of sloped conveyor belts or a bucket elevator.



Recycling with sloped conveyor belt



RECYCLING RING

Introduction of RAP through a recycling ring in an intermediate area of the dryer. This device is very environmental friendly: no introduction of vapor in the mixing tower and no reduction of the production at the tower. Special drying and pre-mixing paddles for RAP.

The maximum quantity of material to be recycled is equal to 35% of total production; this percentage may change depending on the nature and on the moisture of the material to be recycled. In particular, the reclaimed material has to be pre-crushed and with max. 35% of material passing the 5 mm sieve.

The recycling ring is designed to minimize the issues related to the introduction of material into the dryer. The main features of the MARINI recycling rings are indicated below:

- Casing with feed hopper.
- External unloading by-pass.
- Recycling paddles for mixing with virgin aggregates.
- Thermal exchange in the heat recovery zone without direct contact between the recycled material and the flame.
- Anti-clogging discharge chute to the hot elevator, use of direct discharge hopper (except the screen).
- RAP feeders.
- Optional roughing screen.
- Optional granulating mill.
- Feed belt.
- Optical thermometer at dryer discharge.
- Optional weighing station on the belt and aggregates/recycled material ratio control.
- Heating and direct discharge wall insulation.







COLD RECYCLING

CHARACTERISTICS

Using recycling materials to produce an asphalt mixture is advantageous both from an environmental point of view because materials are reused and from an economic point of view because raw material costs are reduced.

A cold recycling line is normally composed of the following main parts:

- No.1 Cold feeders
- Conveyor belt
- Optional bucket elevator
- Metering system, weighing belt, optional weighing scale

BENEFITS COMING FROM THE USE OF RECYCLING MATERIALS

Using recycling materials to produce an asphalt mixture has for decades now been the road the authorities or commissioning bodies have taken in order to achieve objectives such as:

- Obtaining a mix whose characteristics are equivalent or even better than the classic mix produced with virgin materials excavated from quarries and never used before at a much lower price and hence cost to the entire community!
- Reducing the virgin material excavation activities and hence soil erosion whether the quarry be near or far.
- Reducing vehicle traffic for transporting the virgin material, often from faraway quarries, and hence fewer expenses, less pollution and less damage to roads caused by heavy vehicles!
- Recovering materials commonly considered as "waste", especially when coming from areas in proximity of the construction site, allows immediately reusing "resources" that otherwise would need to be handled as waste and would hence involve high disposal or storage costs to the community.

Going into more detail, the primary recycling material in a plant consists of the broken-up pieces of asphalt resulting from road surface milling.

This material, appropriately pre-crushed according to specifications relating to its core composition of aggregates and bitumen, can be hot recycled in the recycling ring located at the terminal part of the dryer drum or cold recycled in the mixer.

According to Decree 7893 of 2012 of the Council of State, this material may be deemed a product suitable for use in the production process of a bituminous mixture.



Recycling asphalt brings the following benefits:

- Reusing a high percentage of bitumen already present in the road crust with consequent saving not only in terms of new bitumen to be added to the mix, but also less pollution connected with the production process, transport and storage of the new refinery bitumen.
- The milled material will already have undergone a stone extraction and sorting process, therefore, depending on the various layers milled, you can be reasonably sure that after the appropriate laboratory tests, you have a material of high quality and homogeneity.

COLD RECYCLING MATERIALS FEEDIND THROUGHT THE RECYCLING RING

The milled material is fed into the aggregate weighing hopper by means of a line composed of the following parts:

- Conveyor belt
- Conveyor belt covers
- Side and lower conveyor belt guard
- Cold recycling material feed and metering unit: bucket elevator, buffer hopper, hatch and chute for metering by weight in the aggregate weighing hopper



Synoptic diagram of the cold recycling line



The recycling material, WITHOUT first drying out the remaining water, is appropriately weighed and then fed into the mixer.

Heat exchange occurs by contact with the heated virgin aggregates, necessary to:

- Dry out the recycling material, however, creating a large amount of steam which is appropriately extracted through a specific pipe and routed to the bag filter.
- The final balance temperature reached will be such as to allow, once the bitumen has been added, producing an asphalt mixture of excellent quality and workability for subsequent paving.

Using this technology, subject to proper pre-crushing of the recycling material, you can produce a mixture with the highest accuracy in full compliance with the specifications.



A maximum of 30% of milled material can be fed directly into the mixer.

MILLED MATERIAL HANDLING

The cold recycling operating system requires handling the recycling material using a conveyor belt and a bucket elevator if necessary.

A mill screen can also be installed to sort the material to be conveyed to the ring.

The milled material is moved from the cold feeders to the recycling ring by means of sloped conveyor belts or a bucket elevator.



Recycling line with sloped conveyor belt





Recycling line with elevator in mixer



SAVING





BUDGET TABLE OVERVIEW

COMPONENT	DESCRIPTION	MARINI NET PRICE [indicative]	INDICATIVE INSTALLATIONS DAYS [minimum]
	"BASIC" RECYCLING LINE WITH CONVEYOR		
HOT RECYCLING	BELT AT THE RING COMPLETE WITH COLD	£ 74 000	8 days
(E190L/R base)	FEEDER, FEEDING BELT (FOR MAX 15 METRES).	€ 74.500	oudys
	NO SW/CONTROL SYSTEM INCLUDED		
	"BASIC" RECYCLING LINE WITH SLOPED		
	CONVEYOR BELT AT THE MIXER COMPLETE		
	WITH COLD FEEDER, SLOPED COVERED BELT	€ 119.500	15 days
	WEIGHING HOPPER AND CHUTE TO THE MIXER.		
COLD	NO SW/CONTROL SYSTEM INCLUDED		
RECYCLING	"COMPLETE" RECYCLING LINE WITH ELEVATOR		
	AT THE MIXER COMPLETE WITH COLD FEEDER,		
	RAP BUCKET ELEVATOR, WEIGHING HOPPER	€ 152.500	20 days
	AND CHUTE TO THE MIXER.		
	NO SW/CONTROL SYSTEM INCLUDED		

NOTE: The prices below must be considered as entry price level so are indicative for a standard intervention and specifically for a recently built plant (1995 to today).

For correct qualification of the best technical solution and final economical proposal of the investment, please contact the area manager and the retrofitting department at the following e-mail address: export.dept2@marini.fayat.com

CONDITIONS OF SUPPLY: DELIVERY EXW ALFONSINE ITALY – WITHOUT INSTALLATION SERVICE



