ARTICLE PUBLISHED

IN THE REVIEW

“DIALOG RUSSIA-PORTUGAL”

TRANSLATION FROM

THE PORTUGUESE ORIGINAL

September 2017

IS.COM

International Strategic
Consultancy & Management

IS.COM
International Strategic
Consultancy & Management

CONCRETE PAVEMENTS THE NEW CONSTRUCTIVE TECHNOLOGIES

IS.Com's new technologies for concrete pavement construction (**SPWS**) apply **to roads, airports, seaports, factories, warehouses and refrigerated warehouses**.

For the last 100 years these types of concrete floors have been made, but concrete slabs always break or fissure. What is the difficulty? When a soil settlement occurs traditional concrete can not keep up with soil movements (this latter is living matter, as it increases in volume with humidity and decrease in volume with dry weather).

What did IS.Com achieved with its new concrete pavement technology was to **enable the slabs to accompany the soil settlements. Almost as if the slabs had flexibility!**

The **SPWS** Slab - Foundation system definitively solved all the issues associated with the instability of natural soils, as well as the slab cracking due to natural settlements of soils.

How? With its **load transfer**

plates that allow the slabs to carry out vertical and horizontal movements.

This exceptional invention replaces the load-transfer bars,

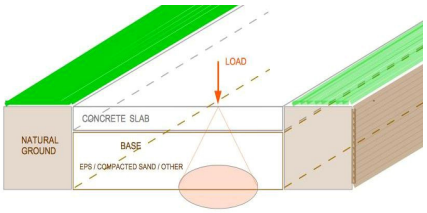
which for the past century have only given evidence of bad behavior, since they only allow slabs to move from 1 to 2 mm, after which they crack

What's the difference? The load transfer plates are placed **alternately at the base** of the slabs and are anchored to the slabs by a rod, which **allows the slabs to move vertically and horizontally, but always ensure perfect continuity of the floor,** while the load transfer bars are placed at the middle of the slabs and cause tensions in these, not accepting vertical movements. When slabs crack they cause immediate discontinuity in the pavement forcing expensive repairs.

Everyone has tried to put a foot on top of mud. What happens? The foot is buried in the mud because the inability of the **soil to withstand a load without deforming (its C.B.R. or K)** is less than the load applied to it.

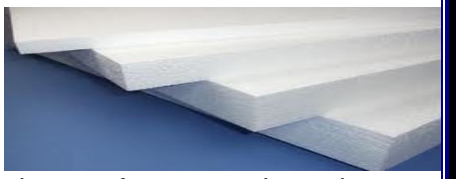
All pavements must be constructed in such a way that the load reaching the natural soil is lower than its C.B.R. (or K).

How do you do this? Pavements are laid on a foundation that is built with several layers (tout venant *(crusher run)*, gravel and sand). The height of these layers is not irrelevant since the loads applied on the pavement degrade into cone, and at the base of this cone the **loads reaching the natural soil per cm2 must be below the C.B.R. of the natural soil so that it does not deform.**



Like the Eskimos who added to their feet rackets that degrade the load of their body over a much larger area so they can walk on snow. The principle is the same!!! So what does this new technology consist of**? It allows building concrete floors cheaper, faster, easier and better.**

How? **This technology allows replacing all layers of the base and the sub base (the foundation) by a single layer** of **E.P.S.** (**High density expanded polystyrene**)



It is very fast to apply and very light (30 kg per m3), which in itself **leads to enormous savings in handling and transport of soil (-64%)**, due to the opening of a box in the natural soil, where the foundation and the pavement will be built (in the case of roads, airports and ports) **that will vary between 35 and 45 cm (against 96cm for the construction with asphalt).**

Also there are **more savings in materials for construction of the classic foundation (70%) as well as in the transportation.**

All together we will have a huge saving on materials and transportation.

ASPHALT LAYERS	SPWS CONCRETE LAYERS
672.000 m3	245.000 m3
735.000 m3	
182.000 m3	175.000 m3
1.589.000 m3	420.000 m3
45.400 Camiões	12.000 Camiões

But that's not all.
Constructing continuously with only one layer of EPS and paving immediately on top of **it will lead to construction time savings of at least 40%.**
The construction of these floors is done by placing the EPS, a plastic film on top (0.2 mm the cheapest to find, which has the only function to allow the retraction of the concrete without friction) the load transfer plates, the joint inductor of (which will open the joint without mechanical intervention exactly where it is intended) **and immediately paving on top**.
The four actions mentioned above (EPS, plastic film, transfer plates and joint inductor (made of plastic or 0.8mm galvanized sheet) are carried out one after the other with extreme construction speed.
Joints are very thin (2mm) and do not need to be sealed, each of which joins is an expansion joint itself.

On the other hand, **EPS**, which is an inert, **has a neutral, durable behavior, without any change in its mechanical behavior throughout the project life**, and forms with the concrete slabs a monolithic foundation.
This way we will achieve **a price saving of not less than 30%.**
But is it always necessary to use EPS as a base? It may not be necessary. There are no universal answers; everything depends on the project data .
.

In general we can say that for pavement construction of roads, ports and airports in principle it will be necessary, but for the construction of floors of factories and warehouses may not be necessary, depending in this latter case on the CBR of the soil.
However one can opt for a classic foundation not using the EPS, but this way losing part of the speed and part of the economy of materials and transports, although not totally, since our steel load transfer plates admit a lighter foundation.
Concrete construction is **much more environmentally friendly, reducing the carbon footprint,** since it is not polluting (as opposed to the asphalt that always infiltrates hydrocarbons on the soil) accumulates much less heat and at the end of its project life all materials are recyclable. It also involves lower vehicle fuel consumption compared to asphalt pavement, since concrete does not deform, and is more resilient to spills (concrete pavements are not damaged by oil or other spills), and is more resistant to temperature variations once the concrete floor does not change its behavior with different temperature and humidity.

The construction of concrete pavements is therefore the future for all these reasons and also for:
- **States**, once they construct more than one third of the planned works with the same budget in less time, contributing decisively to the accelerated development of the economy; and
- **General contractors** once they almost double their installed building capacity with the same equipment.

For more details please visit

WWW.IS-COM.BIZ

For clarifications and answering to any questions we shall be always looking forward it

João Miguens Mendes

DIRECTOR

front.desk@is-com.biz

www.is-com.biz