

Inovação na construção: tendências e oportunidades na Poli USP

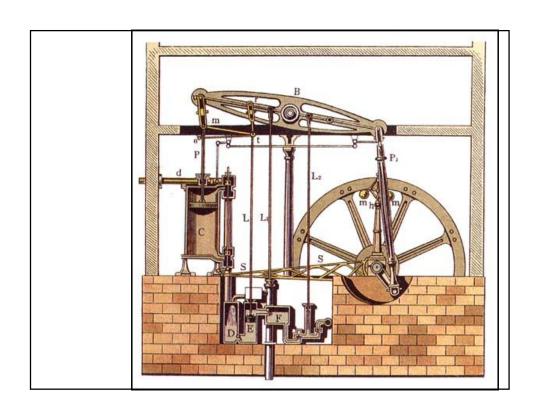
Vanderley M. John Depto. Eng. Construção Civil











Progress depends upon a flow of new scientific knowledge.

V. Bush, "the Endless Frontier" 1945

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É a fonte de riqueza

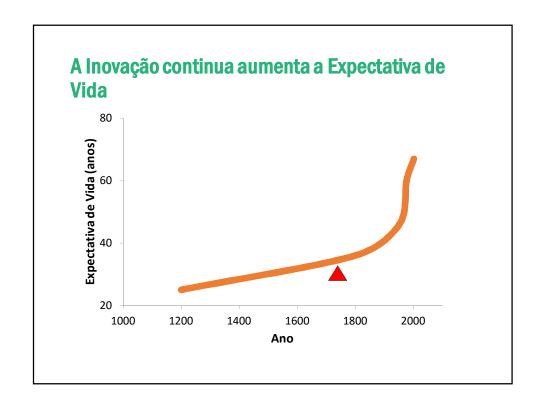
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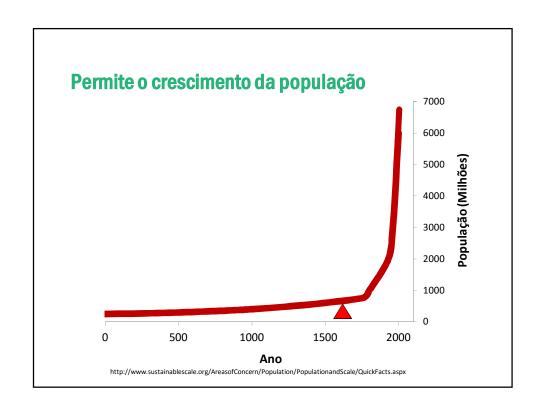
economic growth onf the USA was due to

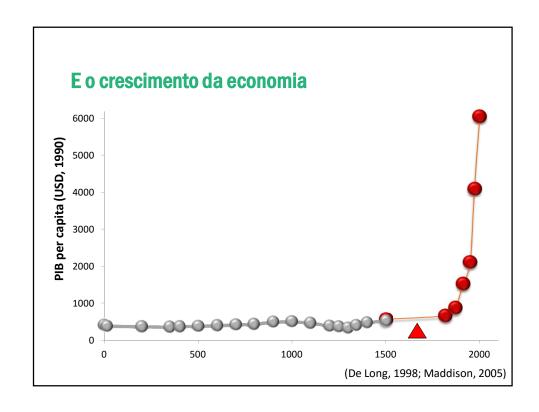
New techologies

Robert Solow (Nobel Prize Winner 1987)

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For **advanced economies**, innovation is a matter of **pushing** the world **frontier of knowledge**.

For **developing countries** technology **assimilation** is the central challenge.

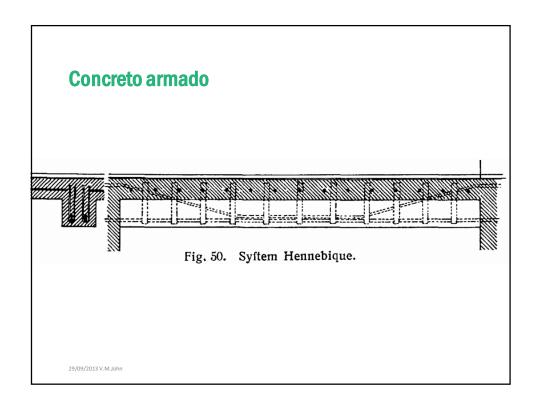
(Porter & Ketels 2003 - UK Competitiveness)

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Inovação na construção

"the construction industry is **infamous** for the barriers it places in the way of innovation," (CERF, 1998).

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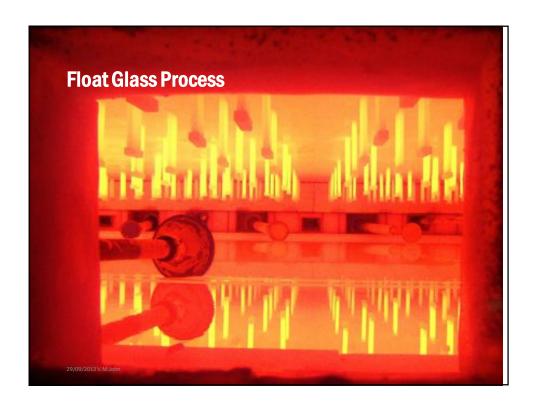


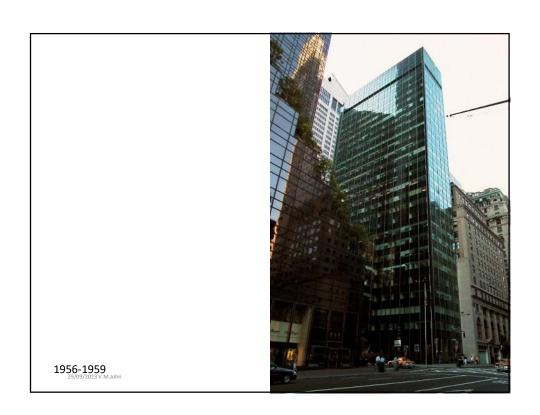
Elevador, edificio pilar e viga

Woolworth Building, 54 and ares, 1913

Ar condicionado



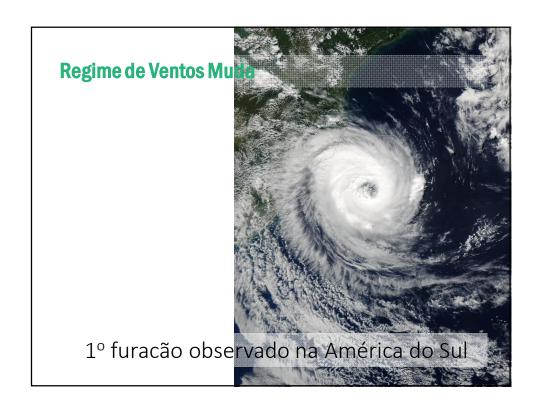


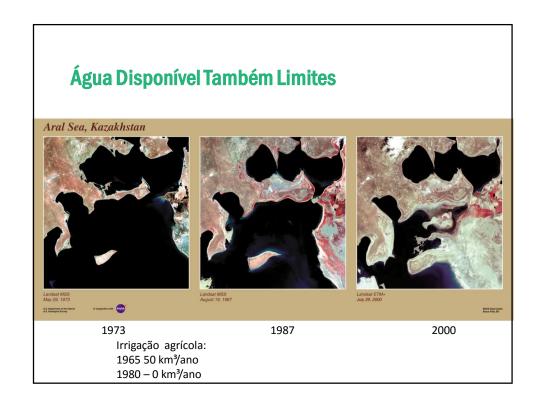


Agenda ambiental

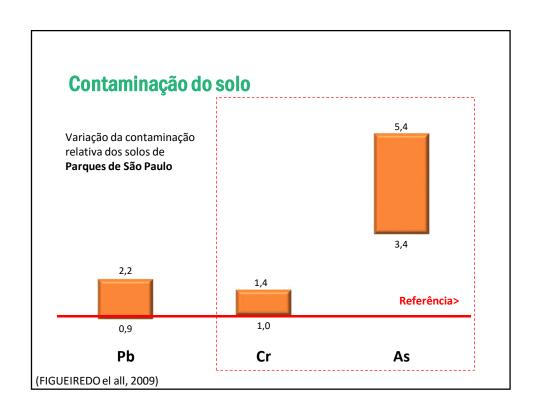
Qual a agenda da inovação na Construção?





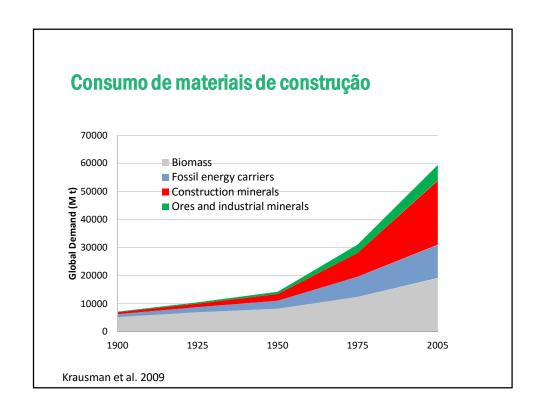


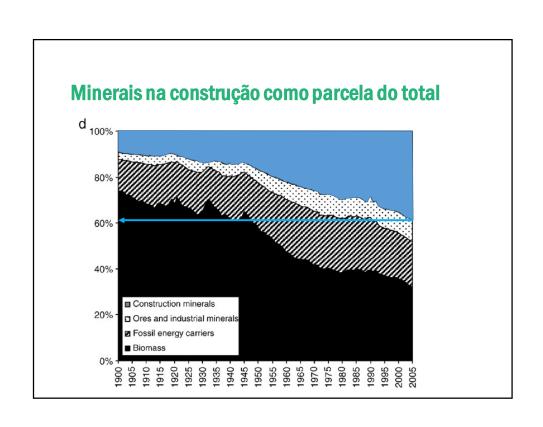






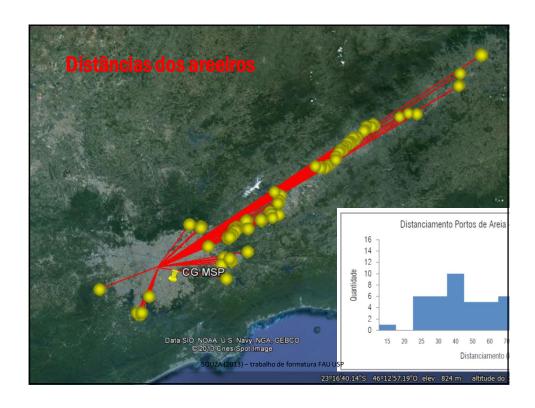










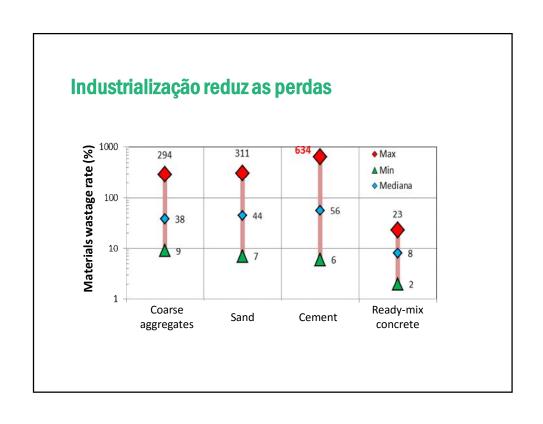










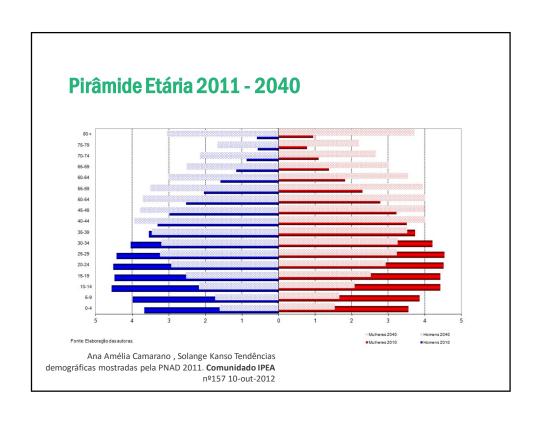


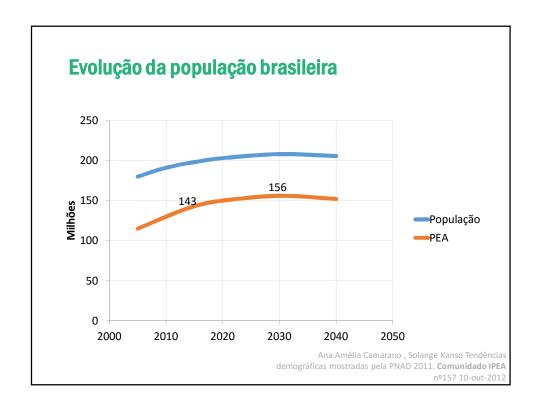


Agenda Produtividade

Qual é a agenda da inovação na construção



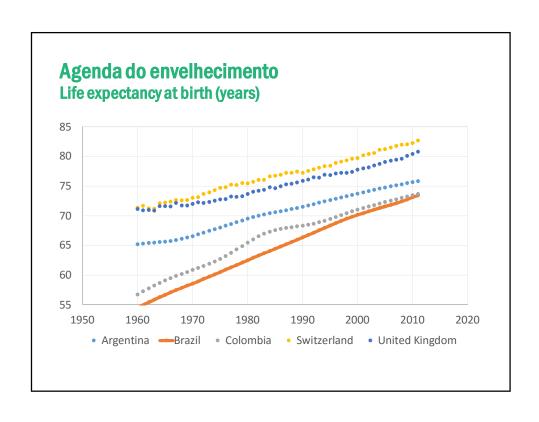




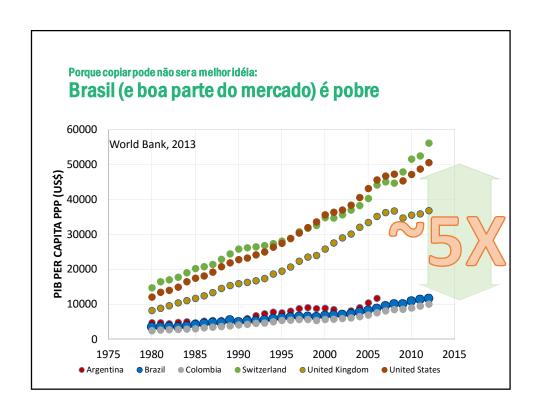


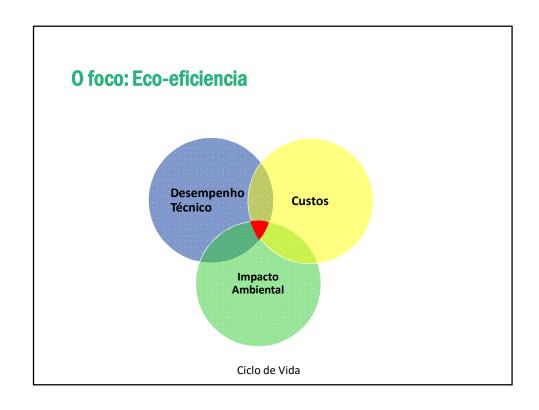
Aumento de Produtividade na Obra Edifício em 6 meses?

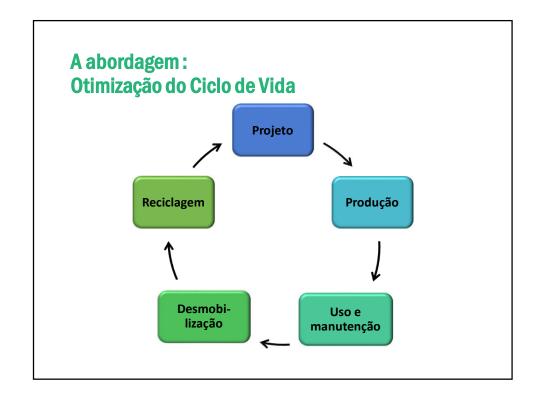


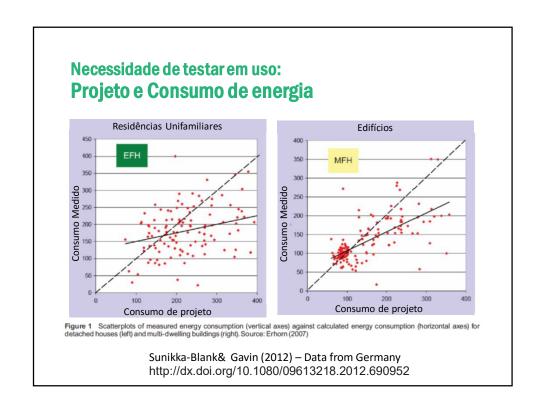


Inovação na construção brasileira











Alguns exemplos de inovação na construção

Innovation Models

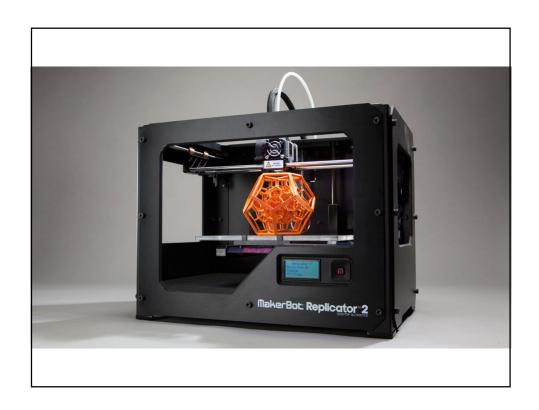
		Concept/Material	
		Reinforced	REplaced
Integration of Concepts and Sub-systems	Inalterado	Incremental	Modular
	Changed	Systemic	Radical

Taylor & Levitt **New Model for Systemic Innovation Diffusion in Project-based Industries.** CIFE Working Paper #WP086. Sanford May 2004

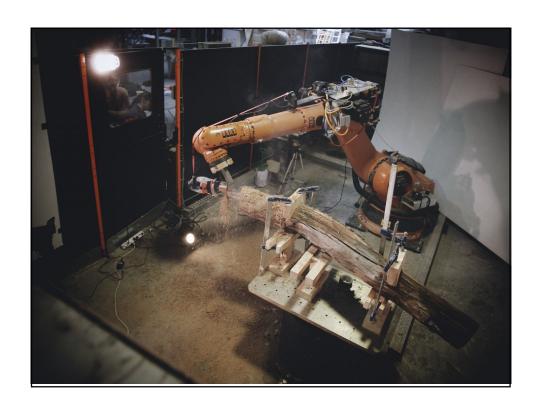
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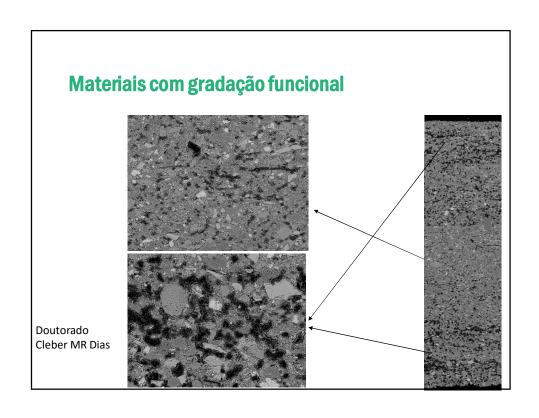




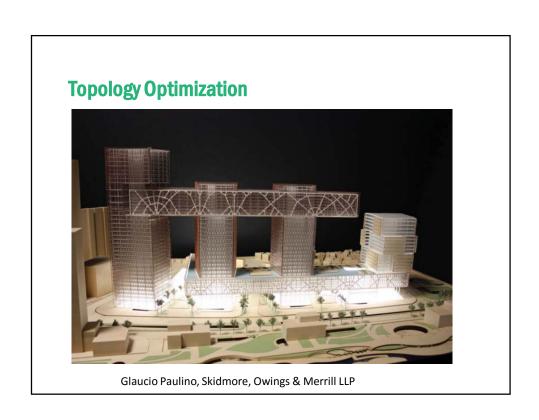




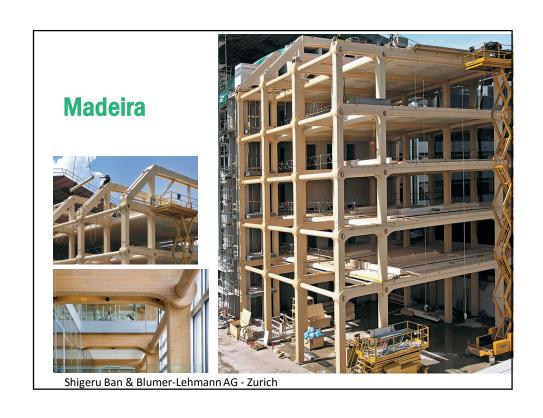






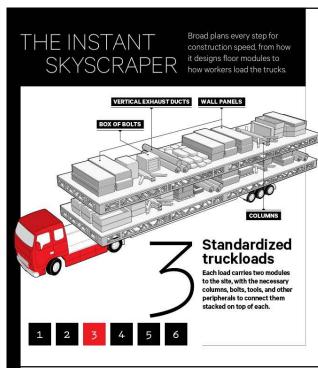








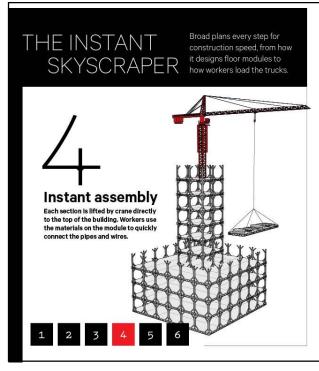




hour's drive from Broad Town. From there the modules—complete with preinstalled ducts and plumbing for electricity, water, and other infrastructure—are shipped to the site and assembled like Legos. The company is in the process of franchising this technology to partners in India, Brazil, and Russia. What it's selling is the world's first standardized skyscraper, and with it, Zhang aims to turn Broad into the McDonald's of the sustainable building industry.

"Traditional construction is chaotic," he says. "We took construction and moved it into the factory," According to Zhang, his buildings will help solve the many problems of the construction industry. They will be safer, quicker, and cheaper to build. And they will have low energy consumption and CO_2 emissions. When I ask Zhang why he decided to start a construction company, he corrects me. "It's not a construction company," he says. "It's a structural revolution."

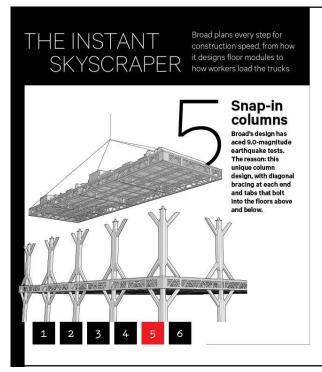
ASKED ABOUT HIS LIFE STORY, Zhang avers that it's too boring to discuss. ("This whole article shouldn't be more than two pages," he says.)



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Fachada Dinâmica

- Multifuncional:
 - Sombreamento
 - Aquecimento de água
- Iluminação natural controlada

Prado, R.T. A. Efeito de Sombreamento Automático no Desempenho Energético de Sistemas Prediais. Tese de doutorado. PCC USP 1996.

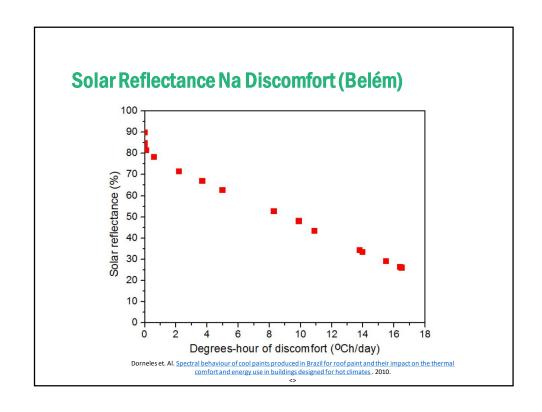


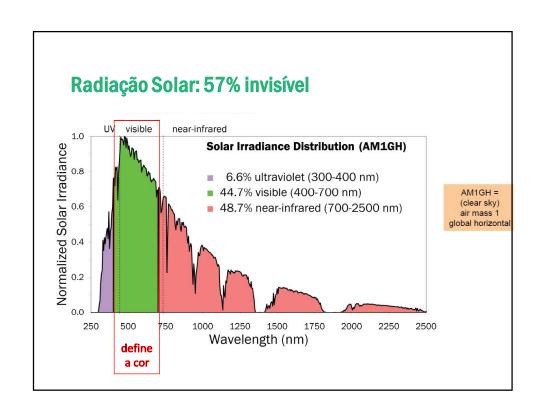
Fachadas Dinâmicas Estão no Mercado

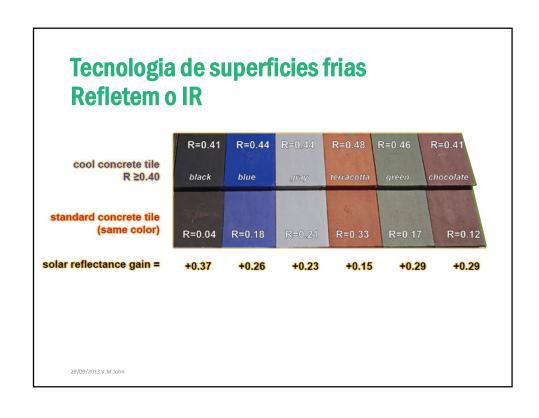


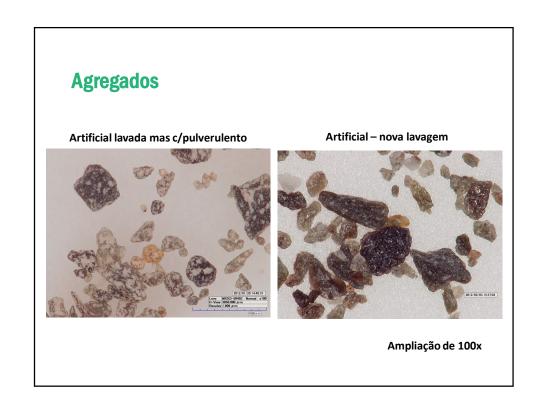
KIEFER TECHNIC SHOWROOM Arq. Ernst Giselbrecth



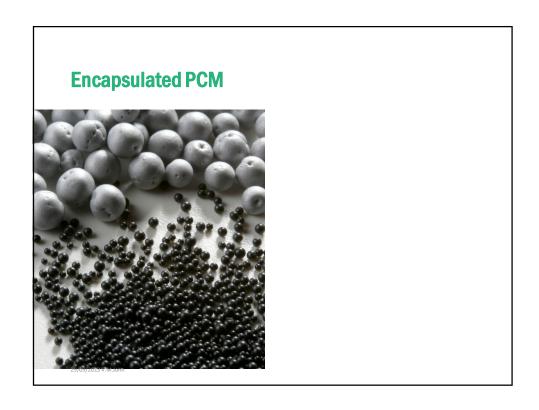












Autolimpante

Efeito Lotus

- Superficie hidrófuga
- Nann-rugneidades



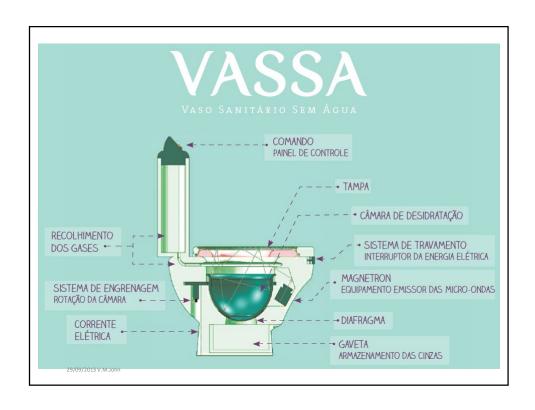
Fotocatálise

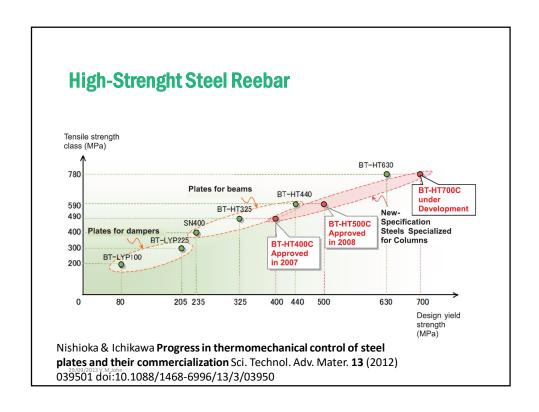
- Ativação de Anatasio (TiO2) por UV
- Superficie fica super-hidrofilica (Angulo de contato << 10º)
- Materia organica oxidada
- Degrada substratos organicos.

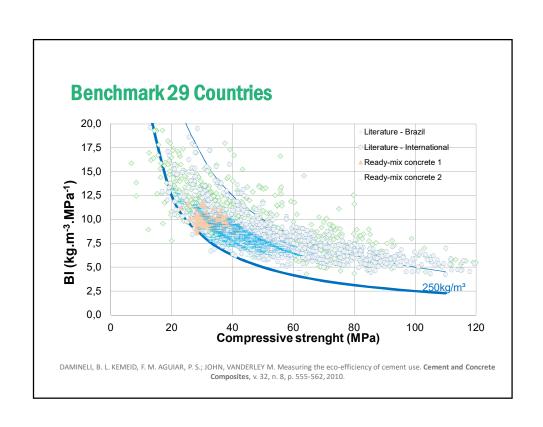
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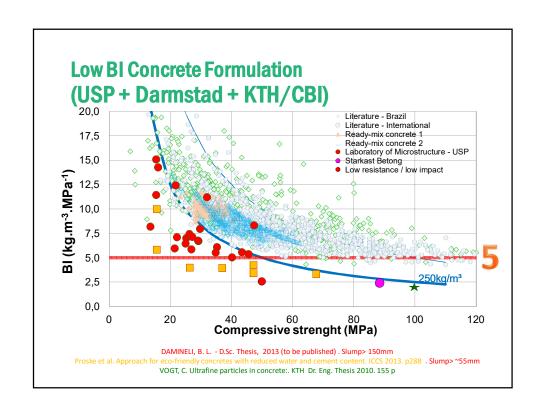
Self Cleaning Glasses Conventional Glass Self Cleaning Glass 29/09/2013 V.M.John

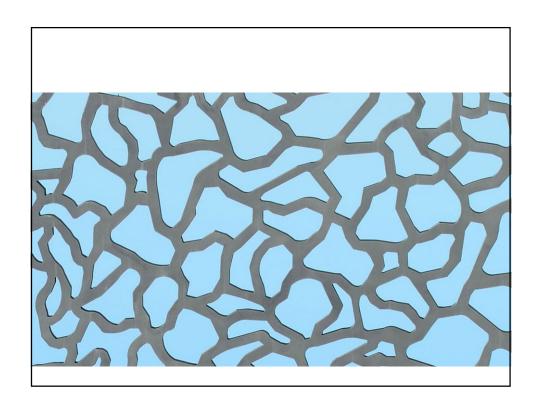








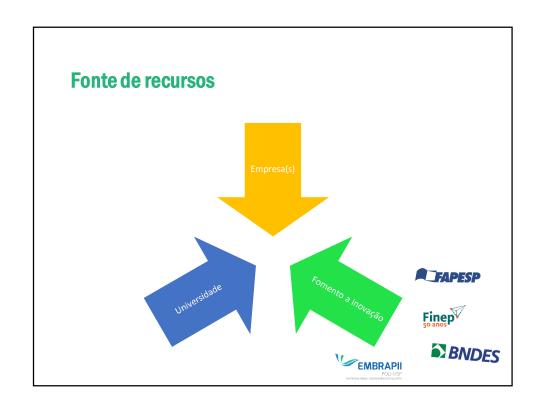




Oportunidades da Poli USP

Forma de Atuação

Abordagem multidisciplinar
Ciência e Eng. de Materiais
Química de ligantes
Impacto ambiental no ciclo de vida
Durabilidade e vida útil
Processamento de minérios
Técnicas construtivas
Engenharia civil & arquitetura
Excelência em padrões internacional





Unidade EMBRAPII Poli USP MATERIAIS PARA CONSTRUÇÃO ECOEFICIENTE





Área de Atuação

Desenvolvimento e aperfeiçoamento de materiais, componentes e sistemas de construção para melhorar a ecoeficiência e aumentar produtividade da construção.

Materiais cimentícios

Desenvolvimento de soluções inovadoras, de baixo impacto ambiental e custo competitivo em ligantes inorgânicos para diferentes mercados.

- Ligantes inorgânicos
 - Cimento
 - Gesso
 - Cal
 - Novos ligantes
- Aditivos químicos

- Argamassas, Concretos & Compósitos
- Materiais avançados
 - Auto-limpantes
 - Auto-reparantes
 - Frios ...

Materiais Granulares

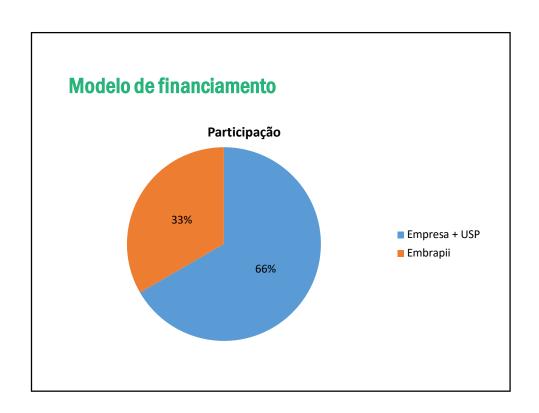
Desenvolvimento de novas rotas de processamento e otimização de desempenho de produtos em diferentes aplicações.

- Fillers, inclusive funcionalizados
- Agregados graúdos & miúdos
- Resíduos como agregados
- Otimização forma e granulometria

Componentes e sistemas construtivos

Desenvolvimento e otimização de processamento e do desempenho ao longo do ciclo de vida de componentes e sistemas construtivos.

- Edifícios
- Pontes
- Tuneis
- Pavimentos
- Pré-moldados
- Estruturas em aço, concreto, madeira, compósitos



Modelo de atuação

- Necessidade da empresa
- Identificação da capacitação interna da Poli, USP e outras entidades
 - Processamento
 - Ciência de materiais
 - Aspectos ambientais
 - Aplicação final
- Formulação da proposta
- Negociação
- Contrato