



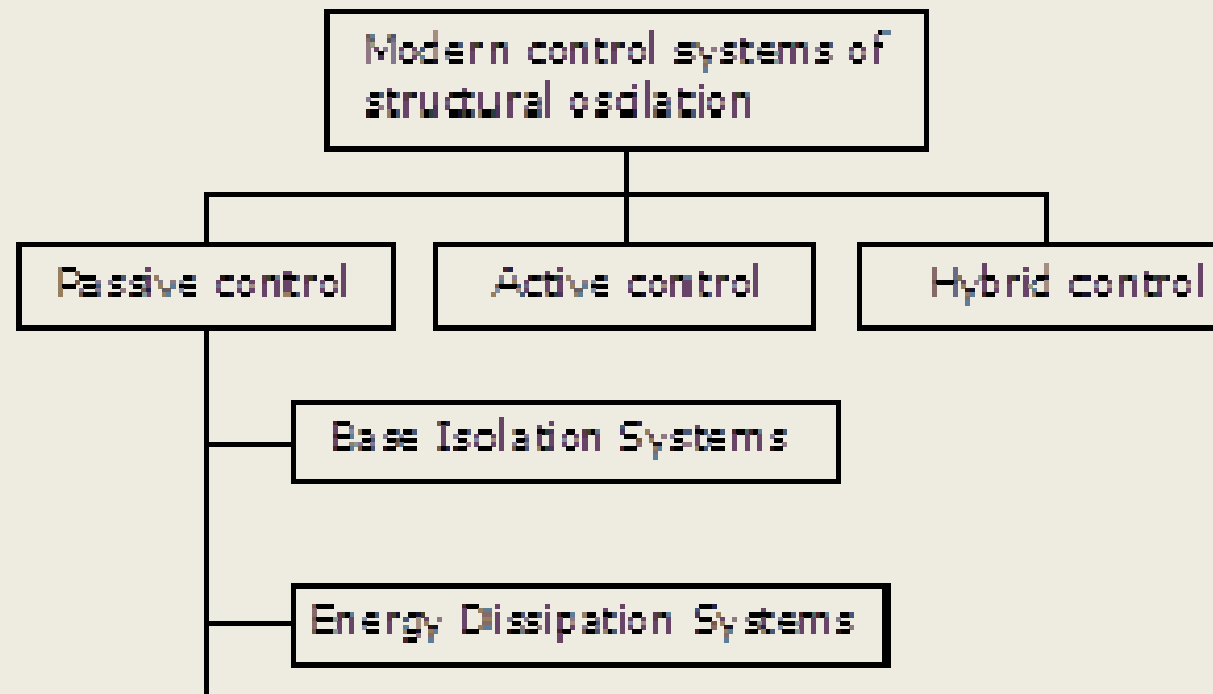
NEW STRATEGIES IN ANTI- SEISMIC PROTECTION

Adrian Dogariu



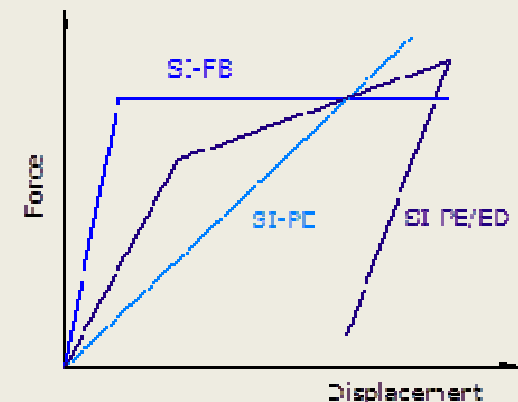
**European Erasmus Mundus Master Course
Sustainable Constructions under Natural Hazards
and Catastrophic Events
520121-1-2011-1-CZ-ERA MUNDUS-EMMC**

NEW STRATEGIES IN ANTI-SEISMIC PROTECTION



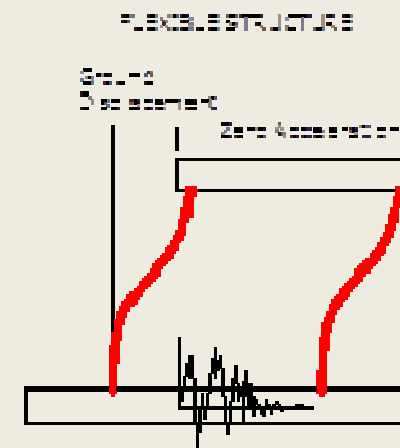
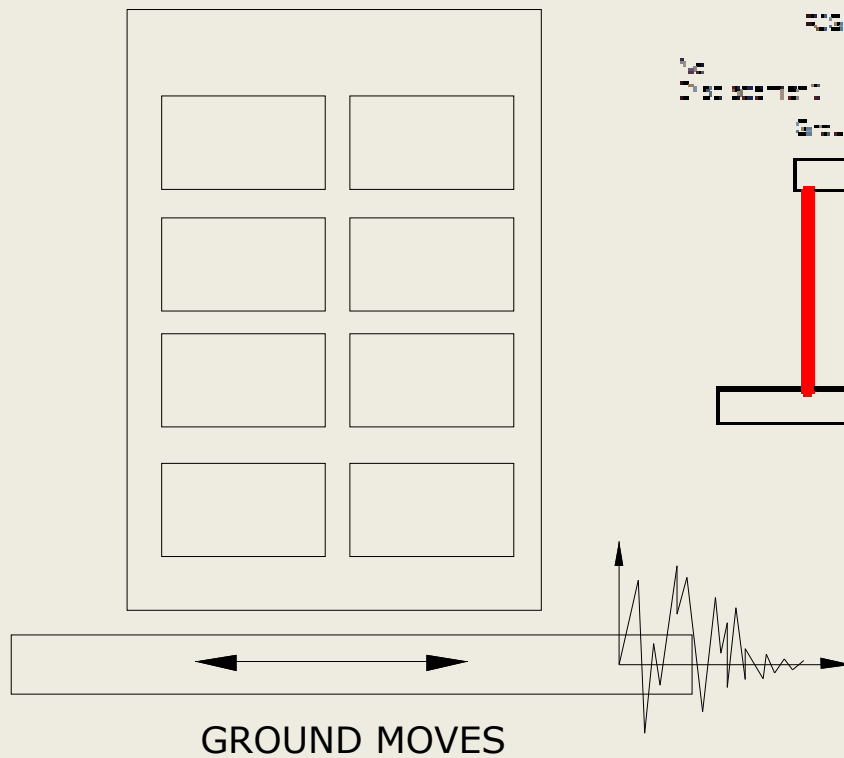
NEW STRATEGIES IN ANTI-SEISMIC PROTECTION

- Seismic isolation systems can be divided into :
- Period elongation systems (PE) – the reduction of the seismic forces is mainly done by means of horizontal flexible elastic supports.
- Force barrier systems (FB) have a plastic rigid behavior or even elastic nonlinear with zero or very low consolidation. The systems are characterized by a well defined step force which prevents the transmission of forces greater than it to the superstructure.
- Period elongation / Energy dissipation systems (PE/ED)



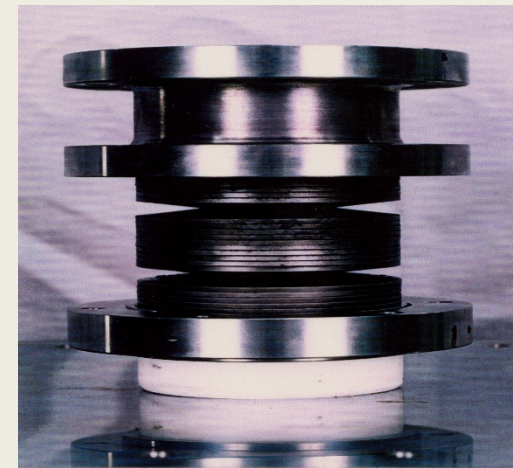
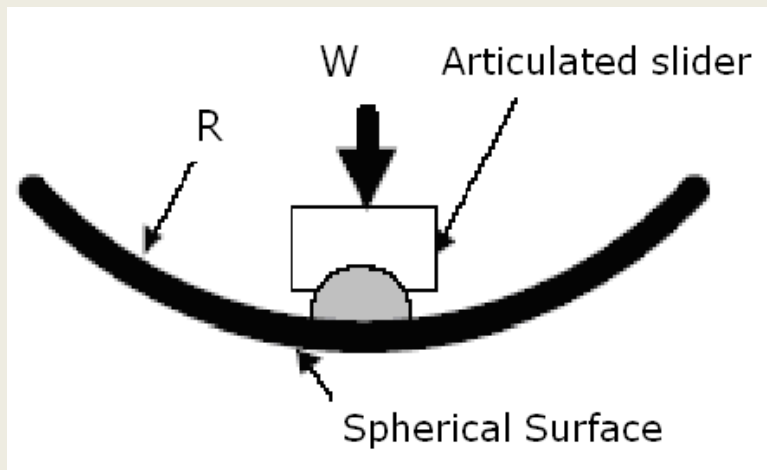
REDUCTION DEVICES

STRUCTURE STAYS STILL



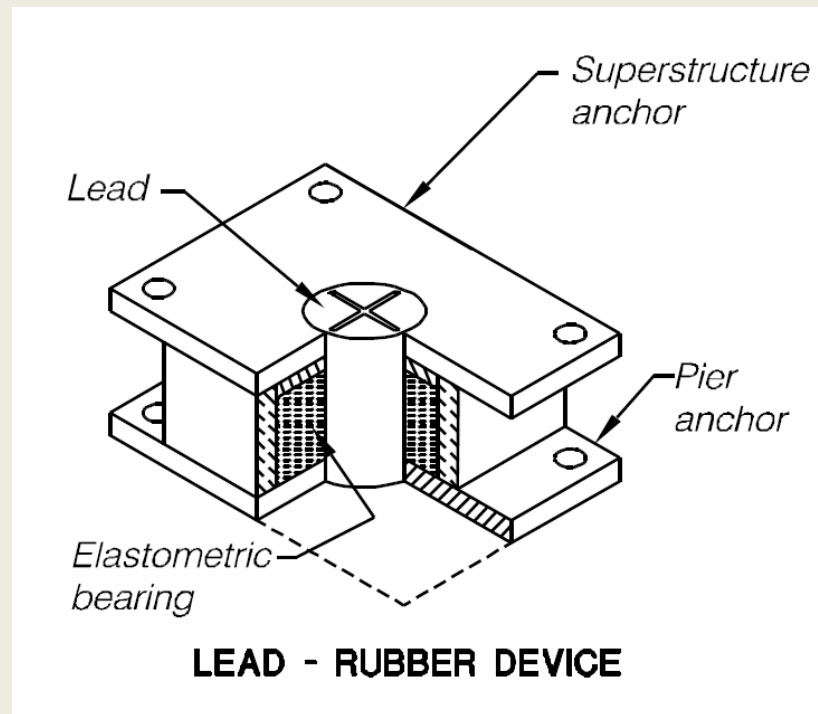
SLIDING OR FRICTION ISOLATORS

- This type of systems has a simple setup based on a clear and easy-to-use concept.
- One layer with a certain friction coefficient will limit the acceleration and the forces transmitted into the system (building) at a prescribed value, equal to the ratio of the friction coefficient and the weight of the building.



ELASTOMERIC SUPPORTS

- These devices are made of multiple layers from thin natural or artificial rubber tied together by metal plates
- The metal plates prevent the excessive deformation of the device under vertical loads which can lead to stability loss for these elements.



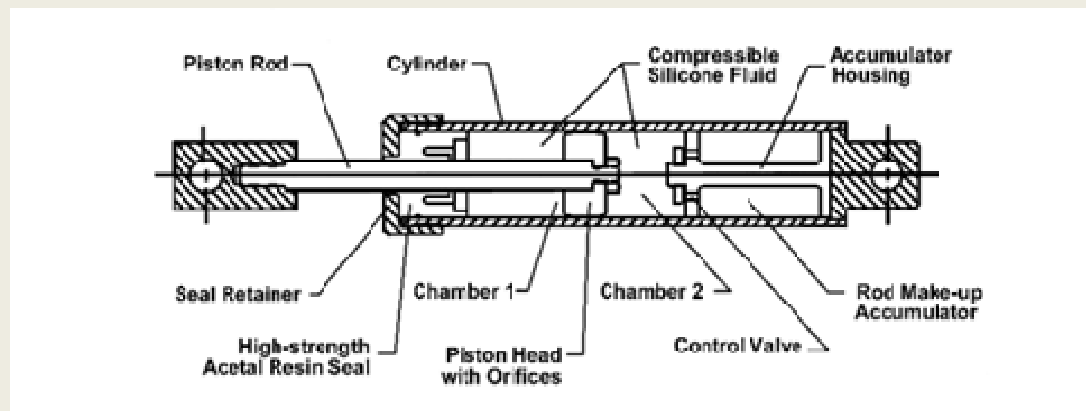
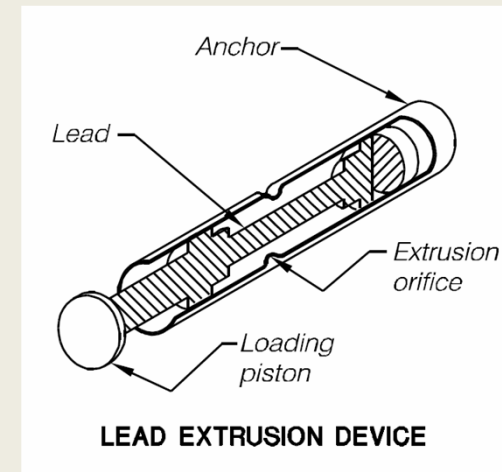
SPRINGS

- They are specific devices based on metallic
- This family of devices is not widely used and they are generally used for the isolation of mechanical machines.
- The main disadvantage of this type of isolators is the increased flexibility, horizontal and vertical.



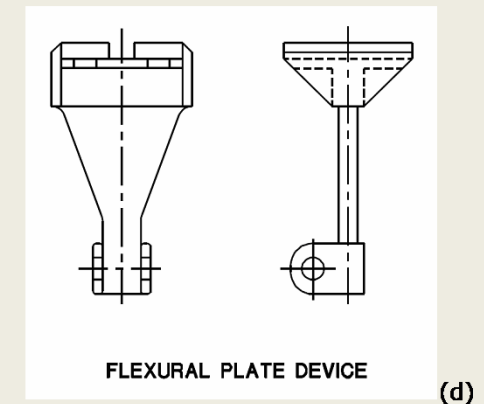
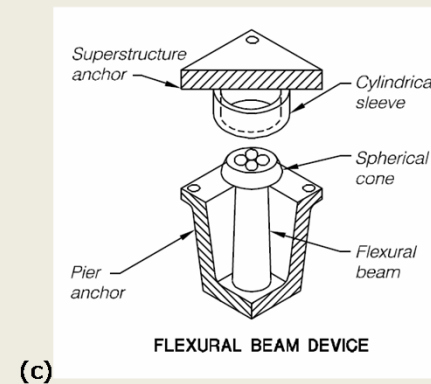
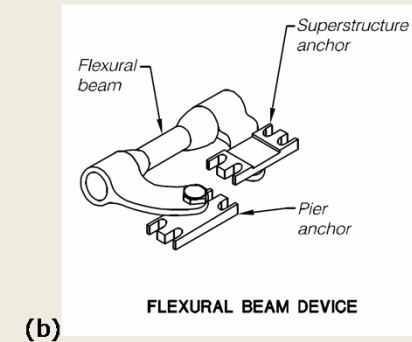
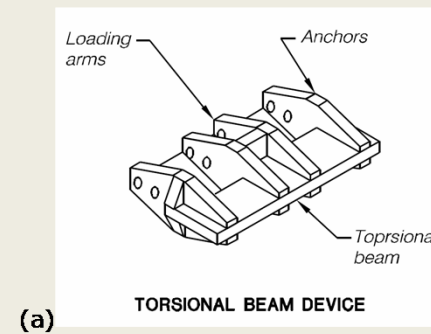
DISSIPATING DEVICES

- Viscous dissipaters (oil dissipaters) – these devices offer a good damping but they do not have any resistance to service loads.
- They do not have elastic rigidity and therefore they introduce into system only a small amount of energy;



DISSIPATING DEVICES

- Devices based on steel yielding – set in such a way as to yield to various types of efforts, as bending, torsion, etc. They offer rigidity as well as a good damping and dissipation
- Devices based on lead yielding act to shear and offer rigidity and damping.



Isolators	Laminated Rubber Bearings	Natural Rubber Bearings		
		Lead Rubber Bearings		
		High-Damping Rubber Bearings		
	Slide Bearings	Elastic Slide Bearings		
		Rigid Slide Bearings		
Dampers	Hysteretic-type Dampers	Steel Dampers	Bar Type	
			Loop Type	
			Portal Type	
			Plate Type	
			Ring Type	
	Velocity-type Dampers	Lead Dampers	Friction Dampers	
				Oil Dampers

