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PSYCHOLOGICAL PROTECTION NEURON NETWORK TO RESCUE DAMAGED BUILDINGS AND THE EXPERIENCED HORROR OF EARTHQUAKES

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Abstract

A huge amount of the Earth's population lives in high-rise apartment buildings. According to Signal Processing theory (Poularikas, 2000); (Jivkov et al. 2013), (Венелин Живков, Симеон Панев, Филип Филипов, (2023), [Through the bowels of mechanics), Mechanics of Mashines], (in Bulgarian)) three type of buildings are described here. Buildings up to 3 stories are high frequency and rigid. They are slightly affected by seismic signals, which are of low frequency than the 3 story buildings. In case of an earthquake, the evacuationfrom at the 3 story buildings takes seconds. Buildings between 3 and 16 floors are strongly affected by seismic signals, because in this frequency range they enter into resonance with the spectral characteristics of seismic signals. Buildings over 16 stories are low-frequency and hardlyresonate with seismic signals. These buildings are strongly affected by hurricane winds, because these are the spectral characteristics of hurricanes. Another very important dynamic characteristic of dynamic inputs is the duration of signals. According to the mechanics of destruction, short-term dynamic signals of less than 10 seconds, for example, can hardly enter into resonance and lead to serious disturbances of massive buildings. Buildings between 3 and 16 floors are considered seismically vulnerable. Evacuation from a vulnerable collapsing building is extremely dangerous and impossible!!! Those trying to save themselves by evacuating from a collapsing vulnerable building go into shock. Those trying to save themselves by evacuating from a collapsing building go into shock!!!!! Fortunately, almost all such buildings are equipped with elevators. This enables them to be combined into a neural network. Dynamic vulnerability type buildings are protected by neural network over the elevator renovation. Such a neural network guarantees full protection of people and animals in existing buildings with elevator devices during a hurricane wind or an earthquake of arbitrary magnitude, arbitrary duration and arbitrary spectral composition of seismic signals. In addition to saving the lives of people and animals, the neural network takes care of the experienced shock. Earthquake survivors in ruined buildings go into shock. This system provides psychological protection also from the shock after rescue from the destroyed neighboring buildings and the experienced horror of the earthquakes.

Keywords: *Psychological protection neural network, elevator devices upgrade, signal processing, cognitive and experimental psychological neural networks.*

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1. Introduction

Psychological Example 1. Some people sense the dangers - they inherited this from the animals. The dog, which has evolved from the wolf through domestication, has the most acute sense of danger in the animal world. Ten days before the disaster in Fukushima 11 Mrch 2011, a large group of Bulgarian scientists felt threatened. They are trying to get help from the then Bulgarian government. Finally, on March 10, 2013, they sent a letter to the Prime Minister. The next day there was a catastrophic earthquake with Magnitude M=9.1, lasting 6 minutes! A tsunami is forming. On March 11, 2011 the Japanese managed to withdraw the nuclear fuel from the Fukushima plant. They don't allow a nuclear explosion. However, the Fukushima nuclear power plant is very old and should have been shut down long ago because it does not meet the requirements of the International Atomic Energy Agency. The power plant remains without POWER!!!!! Loss of reactor cooling led to three core meltdowns, three hydrogen explosions and the release of radioactive contamination. However, in the ocean earthquake and subsequent tsunami, if a parallel plant outside the disaster area was switched on within 10 minutes of the arrival of the 15m soliton wave (this switching operation is seconds in time) and the drop in temperature with the current from the parallel plant had started immediately, the seemingly IMMINENT DISASTER could have been avoided. Hydrogen Thermonuclear ARMAGEDDON could have been stopped...

Psychological Example 2. On December 28, 2022 press group 24 Hours (24 Hours - 168 Stories) warns that a catastrophic earthquake is coming in the Balkans, because there is a huge accumulated seismic potential. A one-week period followed and an earthquake on the island of Crete with a magnitude of M=5.7. After a month and a week, on February 6, 2023, the pair of earthquakes - twins in the area of Kahramanmarash with magnitudes M=7.7 and M=7.8 will occur. Such a phenomenon with a pair of twin epicenters occurs once every 500 years. In Turkey, Syria and Lebanon, the earthquake killed more than 60 000 people. Bulgaria is the first in the world to provide aid to the victims – professionals and volunteers.

Psychological Example 3. Early warning systems SEWS. All known seismic early warning sytems (SEWS) are based on the basic physical property of seismic wave propagation. Equation : $\frac{V_p}{V_s} = 2^{-\frac{1}{2}}$ is the fundamental link on which kinematic SEWS functions. Here V_p is the velocity of the longitudinal P wave, V_s respectively of the transverse wave in [km/s]. These velocities differ from the velocities of oscillation of the media through which the seismic waves travel. The oscillating speeds of the particles are much smaller. The relation between the velocities of the waves always exists in the rigid ideal body and is an immanent property of any perfectly elastic medium. P-waves have compression/extension motions of solid layer particles and travel parallel to the wave propagation ray. These waves are the fastest and have the highest speed in the wave packet – between 6 and 8 km/s. P-wave amplitudes are often the lowest in the entire phase packet of any seismic wave emitted by the seismic source and have less destructive potential. S-waves – have several times larger amplitudes, a much smaller speed in the wave packet 1-2 km/s but a much greater destructive potential due to the movement of the particles of the medium, perpendicular to the propagation of the wave beam. S-waves do not propagate through liquids. Here, SEWS is used as network startup.

Table 1. Seismic Outbreaks.

N	Seismic Outbreaks	Coordinates φ[N]	Coordinates λ[N]	Depth [km]	Distance [km]	T_p [s]	T_s [s]	$T_s - T_p$ [s]
1	Sofia	$23^0 20^{`} 00^{``}$	$42^0 40^{`} 00^{``}$	10	70	13.6	20.8	7.2
2	Kresna	$23^0 10^{`} 00^{``}$	$41^0 50^{`} 00^{``}$	10	90	18.4	31.3	12.9
3	Plovdiv	$25^0 00^{`} 00^{``}$	$42^0 10^{`} 00^{``}$	10	180	30.0	51.8	21.8
4	Gorna Oriahovitca	$25^0 50^{`} 00^{``}$	$43^0 10^{`} 00^{``}$	10	210	33.8	68.7	24.9
5	Shabla	$28^0 30^{`} 00^{``}$	$43^0 30^{`} 00^{``}$	10	276	42.0	53.0	31.0
6	Vranchea				380	55.5	99.8	44.3

Described technical solution of the Neural Network of inertial motors for damping the dynamic impacts from an earthquakes or winds is presented idealized here. The system SWES described here system is designed in a capacity of starting subsystem for the Main Neural Network. The actual applications of proposed technologies are more complicated and required a detailed engineering design for each specific building in the proposed Neural Network according to the BDS – Bulgarian Government Standards.

2. National neural network

From the Figure 2 and Figure 3 it follows, that due to the demographic crisis in Bulgaria, the modern population of the country is about 7 000 000 people. They live in about 3 000 000 households.

There are about 2 000 000 residential buildings in the country, at least 30% of which are vacant. At the beginning of the 21st century, the **earthquake prediction** marked a development.

An alternative to these earthquake prediction studies are possibilities to creation of structures with actively controlled dynamic response and seismic isolation.

Figure 1.

Figure 2. Population of Bulgaria.

Figure 3. Population, Households, Housing (https://census2021.bg/).

Table 2. Research database for the described in the article investigation.

N	Rescue Operations and the assessments	Altitude of the peaks in m, Persons, Year	Assessment of the psychology situation (history and of the rescue operation)	Technical assessment (of the situation and of the rescue operation)	Rescue Operation Result
1	Vitosha	Black Top 2290 (Skoparnika) Todor Bojinov 15.02.1992	Negative	Negative	Fatal
2	Vitosha	Black Top 2290 Marieta Rajnova 31.12.1884	Negative	Negative	Fatal
3	Rila	Kalinite 2667 Michail Munzov 18.07.1999	Negative	Negative	Fatal
4	Rila	Mussala 2925 Dimitar Zlatarev 16.02.2005	Negative	Negative	Fatal
5	Pirin	Todorka 2746 Two boys snowboarders 11.01.2019	Satisfactory	Positive	Fatal
6	Vitosha 	Black Top 2290 Dog Roko 20.04.2019	Satisfactory	Satisfactory	Happy
7	The Balkans	Botev 2376 Atanas and AdrianPenchevy 05.02.2020	Satisfactory	Positive	Fatal
8	Pirin	Todorka 2746 Borislav Garibov 24.01.2021	Satisfactory	Positive	Fatal
9	The Balkans	Botev 2376 Todor Jeliazkov 02.01.2021	Negative	Satisfactory	Fatal
10	The Balkans	Botev 2376 Yang man 10.02.2021	Satisfactory	Positive	Happy
11	Rila	Kartala Yang man 21.03.2021	Negative	Negative	Fatal

12	Pirin 	Todorka 2746 Vladimir Carolev 10.05.2021	Positive	Positive	Happy
13	Rila	Djano 2700 Irena Gancheva	No data	Positive	Fatal 20.10.2021
14	AM Struma	**AM Struma** **46 Victims** **23.11.2021**	No data	No data	Fatal
15	Sofia-Georgy Semerdjiev Blv.Black Top-Arsenalsky	Sofia Two Yang Girls 05.08.2022	Negative	Negative	Fatal
16	Burgas Trapezica	**Burgas** **Yordan Iliev** **Atans Gradev** **25.08.2023**	Negative	Negative	Fatal
17	Turkey Boundary	Turkey Boundary Peter Buchvarov 08.11.2022	Negative	Negative	Fatal
18	Pirin	Vihren 2914 Plamen Hristov Dragan Glisich 26.12.2022	Negative	Negative	Fatal
19	Rila Paraplaner	Mussala 2925 Toma Stojichkov 08.01.2023	Satisfactory	Satisfactory	Fatal
20	Turkey Syria Leabnon **A huge amount of Radon gas**	**Earthquakes** **M 7.9 6.02.2023** **M 7.6 7.02.2023** **M 6.4;5.8;5.2;5,2** **20.02.2023**	Negative	Negative	Fatal More than 50 000 victims
21	Larissa, Grecee  [16,17]	Railway accident 28.02.2023	Negative	Negative	Fatal 57 victims
22	Lesnovo  Aircraft [16,17]	Lesnovo 8.01.2023 Georgy Vlaykov	Negative	Negative	Fatal
23	Sofia, lozenec	Svetoslav Mladenv *, 18 September 2023	Strongly Negative	Strongly Negative	Fatal
24	Pirin	Vihren, 2914m, Plamen Hristow 27 December 2023	Positivee	Negative	Fatal
25	Black Sea, Kiten	Kiten 15 Juny 2024 Silvia Bobeva	Positive	Strongly Negative	Fatal
26	Sofia, Ring road	Dimitar Petrov *, 18 November 2024	Strongly Negative	Terrible	Fatal
27	Pirin, Todorka Peak	25 years old Snowboarder David Dimitrov 20 December 2024	Positive - A Neural Network could be created to control skiers and snowboarders with sensors implanted in skis and snowboards.	Positive	Fatal
28	Vitosha, Aleko Hut	51 years old Tourist, Infarct 21 December 2024	Positive	Negative	Fatal
29	Rila, Prohibited ski slope Marcudjik 3	Greek citizen 22 December 2024	Positive	Positive	Fatal
30	Pirin,Todorka,28.1.2025	Irishmen 29 y old	Positive, photo selfie, 600 m	Positive, helicopter disaster	Fatal

3. Seismic and wind infrastructure vulnerability

A huge amount of the Earth's population lives in high-rise apartment buildings. According to Signal Processing theory (Poularikas, A. D. 2000) three type of buildings are described in the report. Buildings up to 3 stories are high frequency and rigid. They are slightly affected by seismic signals, which are of low frequency. In case of an earthquake, the evacuation takes seconds. Buildings between 3 and 16 floors are strongly affected by seismic signals, because in this frequency range they enter into resonance with the spectral characteristics of seismic signals. Buildings over 16 stories are low-frequency and hardly resonate with seismic signals. These buildings are strongly affected by hurricane winds, because these are the spectral characteristics of hurricanes. Another very important dynamic characteristic of dynamic inputs

is the duration of signals. According to the mechanics of destruction, short-term dynamic signals of less than 10 seconds, for example, can hardly enter into resonance and lead to serious disturbances of massive buildings. Buildings between 3 and 16 floors are considered seismically vulnerable. Almost all such buildings are equipped with elevators. This enables them to be combined into a neural network.

4. Contemporary anti seismic engineering monitoring for real time processing of building dynamical behavior

Contemporary anti seismic engineering monitoring for real time processing of building dynamical behavior is developed in this report (All Sources). Proposed national neuron network can be used in addition for seismic engineering monitoring by elevator devices improvement. 3D accelerometers, mounted in elevator shaft have negligible low price and they elaborated in a real time frequency analyses of seismic signals in the reminded building as an addition digital result of the system. The amplitude frequency transfer function is important engineering data for the building response under seismic and wind dynamical loadings. This data is elaborated of each computer of the building under investigation. In the network all several million results of elevator devices are taking into account in real time for seismic or wind dynamical loadings for the seconds.

5. Active and passive wind and earthquake protection systems

These systems are the main part of the proposed national neural network for wind and earthquake protection based on the renovation of the existing elevator devices. The active control system mounted in reinforced concrete elevator shaft is presented in the Figure 4. The passive control system is presented in the Figure 5.

Figure 4. Active Control System.

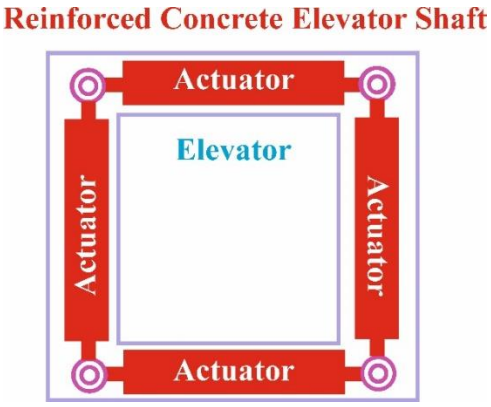
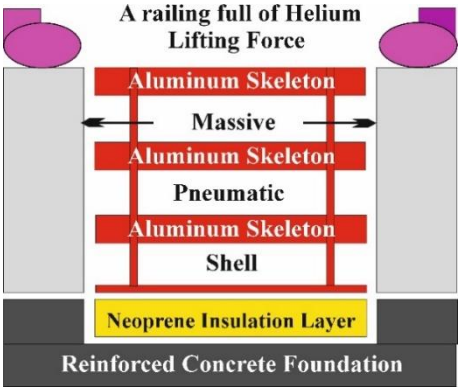


Figure 5. Passive Control System.



6. Conclusions

The Neural Network provides complete protection against of harmful effects from dynamic loads - winds and earthquakes.

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