

Job Satisfaction and Safety on Steel Structures

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As continual coming in my head beautiful picture of the bridge over river Parana in Argentina named General Belgrano with my impression about this heavy and so long steel construction made for transfer of big river. I always thinking how is installed huge steel construction and mass in one beautiful totality: The Bridge General Belgrano. Put in normal use and operation for traffic of people and merchandise is one moment for celebration with speeches and drink. At the end of such big job perhaps true impression would be if would be presented how much efforts and sweat followed this job.

Each such job is observed and controlled regarding nominal tension and field point stresses of each steel items installed in construction, what is known of previous technical data of material. How is characteristics of depths of microcracks caused by fatigue of material.

All intensity of cracks and concentration followed by loading. Conditions of capacities and probabilities and limit of capacity (loading) installed of vertical and horizontal steel items in such construction. Where is vicinity of brittleness. Measurements and probability what happens in some near or far time (future)? How is time moving of index of development on steel construction, bridge piping systems or heavy steel vertical girders, etc.? How long is duration after such detailed analyses and checking? Index of probability of keeping loading-capacity continual? How much is duration of bridge or pipelines? When is the fatigue and depth of critical cracks? Heres is not moment to forget whole shape and dimensions of cracks in steel material? What is critical depth of crack? Such broad and detailed analysis of installed steel structures can be concluded insurance and reliability of such metallic structure? Some other methods can be used for the analysis and can assist to have true information for maintenance and eventual repairing of already installed steel structure. Eventual application Monte Carlo method not excluded in existing enough evidence data.

VIBRATIONS INDICATED AND TESTED IN THREE AXIS

During installation and fixing of pipelines or piping systems, many other items are attached to assure satisfied operation during whole life guarantee time. In some special cases, for example, to be installed Shaker Mounting and Stacker Fixture, at which places is ordered small moving and stepping of such small moving of piping system designed by main project. All these behavior of steel structures - pipings, bridges and vertical girders must have vibration fixtures to decrease or annulate vibrations that can cause some undesired appearances and further damage and distort. Shaker & Stacker to be provided by main project regarding to all mounting positions to assure uniform-equal transmission and balance of energy. Some degrees of freedom of moving to be in accordance allowable in three axis

of moving. Therefore before putting in operation of such steel structures to be tested and tested in three axis vibrations. On this way can be accomplished evidence of allowable vibrations in three axis vibrations. By fixtures create perfectly balanced assembly mounted on opposite side two identical testings. It is very important that main design of whole construction pipelines or steel structures (bridges) in drawings are introduced freedom of moving on x, y, z axis of whole project.

In accordance with ordered and calculated allowable vibration of whole construction all other items-equipment to be on this way attached and fixed for normal operations. On this way to be perfectly balanced assembly. To have exact information about eventual vibration we can provide on the construction in a variety of sizes to fit any electrodynamic, hydraulic or mechanical shaker and stackers. With all this equipment, it is possible to regulate vibration absorption and improving control at resonance and solving them.

FAULTS AND FAILURES IN CONSTRUCTION SHOT PEENING YES OR NO

Probability of appearance confirmed and applied of Monte Carlo tests uses random numbers to solve problems that are intractable. It is clear that many numbers of cases can confirm that this method is very applicable.

This is practical tool now that computing this reality available for further procedure. Steel structure piping, bridges have during period of life and maintenance many shapes and forms of vibration. Vibrations is one natural phenomena that causes many problems.

Shot peening in reality is one tool to solve problem of microvibration. Many ways existing what is necessary to decrease size of vibration. Small size them cannot make much damage on the material of steel structure. This is not harmful. If we have in this procedures many tested cases we can apply method Monte Carlo tests. But we know that shot peening in general making betterment in the internal metallic structures of welding joints. During period of welding internal structures - crystals getting the warmth what causing internal disorder and additional stresses. One method for decreasing these residuals tress caused by welding. Testing of stresses before and after welding must exactly confirm that some exact microvibration annulated or decreasing residuals tresses in welding joint. This is necessary to confirm these data after measurements. Question is to see and check is the shot peening in reality one application for this purpose. Always to be put question Yes or No. Many sort of peening for solving problems in metallic production.

Precision shot peening, saturation peening, peen forming, peen straightening, small slot and hole peening, remedial treatment for porosity, strain peening, peening for test purposes, pipe peening, dual or duplex peening, decorative peening, screw read peening, etc. It is aim to select what is best.

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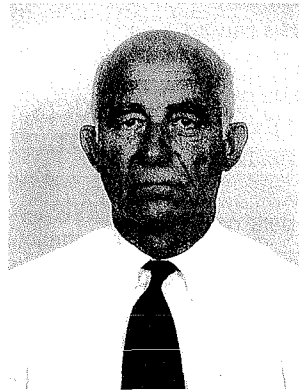
CONCLUSION

Previously mentioned, faults and failures in construction are appearing in production. What is necessary to prevent such undesired facts in production process. Mentioned method of Monte Carlo is used if existing enough statistical data to apply this method. It is necessary that steel spring elastomeric shock and vibration isolators ensure that when generate power. We don't like to generate destructive vibration at the same time spring isolators with steel housings providing static load ranges static deflection as manufacturer recommendations axial and radial loadings fail safe design equipped with internal or external leveling a shock and vibrations isolators when you generate power. The fracture seems to start so some point in the member at which the stress is much larger than calculated stress. The high localized stress and vibrations seem to cause small cracks

which gradually spreads as the stress is repeated until the whole member ruptures without measurable yielding. The fatigue failure of a ductile material is similar to that of a static failure of a brittle material. The new isolators of vibrations guarantees that you generate just power nothing else quiet mounts. Based on the exact sizes vibrations and shock controller that deploys an intuitive graphical user interface with its drives accessories provides economical, expandable and accurate solutions including random, sine and classical shock and vibrations. That means final is useful for normal operation equilibration or calibrational shocks, stress and vibration. This is main aim and idea for everybody connected or in charge of finding the best solution. Reducing, analyzing, interpreting test data diagnosing measurement errors, validating, certifying tests results, performing modal tests, correlating data with finite element analysis. ○

Biography: Salko Djozić

Editor's Note: Salko Djozić is a long-time subscriber and contributor to our newsletter and an active participant in advancing shot peening in his country of Croatia.



Salko Djozić, B.Sc. Senior Mechanical Engineer, was born in Bosnia 75 km north of Sarajevo in the very forested region of state. After Secondary School, he studied at University of Zagreb at Faculty of Mechanical Engineering and Shipbuilding. After finishing studies at University, he was employed in many factories for mechanical equipment. Most interesting job was workshop drawings for pressure vessel spheroidal for liquid gas.

Mr. Salko was working in Italy in Petrochemical concern on calculation of horizontal, vertical reservoirs and heat exchangers in accordance with American rules API, TEMA, ASTM, ASA, AISI, etc. for different Petrol Societies (BP, GULF, SHELL, etc.) and for other oil refineries all over the world. His job followed far on the installation of mechanical equipment on the new powerhouses in many countries mainly under supervision of American engineering contract companies.

He worked for a short period in research center laboratory of FIAT car manufacturer-application of Shot Peening in car construction. He has made exom for authorized Engineer for Mechanical Area. He has worked in Germany, Pakistan, and Iraq.

In Croatian Ministry of Science and Technology, Mr. Djozić is registered under Number 164392 as Scientific Researcher and Explorer for Mechanical Engineering (Heat Exchangers, Pressure Vessels) after an Examination.

He has received five prizes for invention: Main Yearly Prize of Technical Culture of Croatia 1988, Second Prize: Lobet Prizes in Slovenia for Innovations on the Exposition, KAIROS prize on the Croatian Manifestation of new ideas and Innovations in Zagreb 1999. Many times on the Innovators Fairs Croatia in Zagreb INOVA received some recognitions. He was an active participant in the French-German Scientific Symposium on Shot Peening in Strasbourg, France in 1994.

In Pittsburgh, PA he worked in US Corp. on mechanical equipment for new rod-roll Mills in steelworks. During last patriotic war in Croatia, he reconstructed 10 civil trucks for military defense purposes.

But his hobby is Shot Peening - application on welding joints. Also published some papers in professional magazines: Germany (Praktiker, Sweissen+Schneiden, Werkstatt und Betrieb), USA (Plant Engineering, The Shot Peener), Slovenia, Croatia and China accepted and printed. Mr. Djozić participated with three papers on the International Conference on Shot Peening ICSP 6 in San Francisco 1996, on ICSP5 in Oxford, and on ICSP7 in Warsaw, Poland with five accepted and printed in Proceedings Book of this Conference.

As a volunteer, Mr. Djozić has given blood 105 times for humanitarian, hospital purposes, etc. In addition, Mr. Djozić has successfully completed three levels of Bible School at Sussex, England. Doctor Dissertation (Ph.D.) from the Field of Shot Peening made at University in Slovenia based on the Laboratory - Workshop Testing but has not yet defended it due to financial obstacles. ○