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#### “A SURVEY ON OFFSHORE FRAME DROP TEST”

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#### ABSTRACT

*Drop test is free fall of component. It is generally performed to check the ability of product to withstand suddenly applied loads. Drop test is one of the functional test requirement of crash frame for DNV certification, hence crash frame has to qualify through the drop testing as per DNV guide lines before it goes to market for actual use. Crash frame is cage structure, generally manufactured by combinations of standard tube sections, bended C sections and plates. Its purpose to provide safety to the components which are mounted inside it. These offshore frames are generally used for packing industrial components or industrial machine to protect it from damage when its being transported from one place to another or lifted by crane to place it on ship or ground.*

*Key Words: DNV, drop test, frames, crash, offshore.*

#### I. INTRODUCTION

Drop check is loose fall of component. It is typically carried out to test the capacity of product to resist abruptly implemented masses. Drop check is one of the practical check necessities of lifting body for DNV certification, as a result body has to qualify via the drop checking out as in step with DNV manual strains earlier than it is going to marketplace for real use. This allow layout groups to recall genuinely any field drop check without incurring the cost related to production and gadget time. Numerical implementation of effect check is important to shorten the layout time, decorate the mechanical overall performance and decrease improvement cost. This study has a look at offers with the simulation of effect check for a brand new product through the use of finite detail analysis. Simulation becomes carried out to research the strain and displacement distributions for the duration of effect check. As a result, the usage of express finite detail technique to are expecting the overall performance of recent merchandise layout is changing the usage of bodily check. Containers designed and licensed in line with this Standard for Certification need to have enough electricity to resist the regular forces encountered in offshore operations, and now no longer go through whole failure even supposing issue to greater intense masses. These frames are typically used for packing commercial additives or commercial gadget to shield it from harm while it's being transported from one region to any other or lifted through crane to region it on deliver or floor. Crane raise the Lifting body containing the system internal it to transport the body from one region to different, whilst putting it onto the floor maximum of the time crane releases the Lifting body simply above the floor which ends into effect at the Lifting body. This effect may also effects into excessive stresses and lines on a body and finally reasons harm to the system internal it that can create loss in phrases of time and money. Since offshore operations are very pricey any transportation failure or system harm can creates a large loss for the agency, Hence effect wearing ability of the Lifting Of body need to be known, earlier than it's far virtually being examined so one can layout it in greater green manner to keep away from the damages whilst handling.

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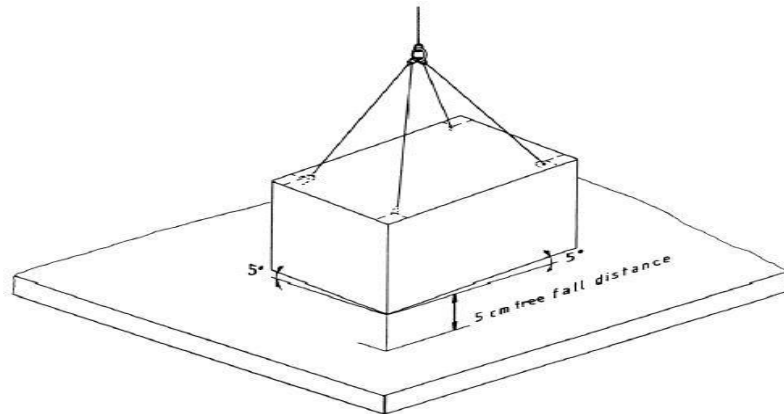


Figure. 1 DNV 2.7-1 Drop Test Set up Requirement

## II. LITERATURE REVIEW

**M. Muni Prabaharan et al [2012]** had offered a paper on Static Analysis for Container Drop Test with a Case Study. This studies observe offers with the simulation of effect check for a brand new product via way of means of the usage of finite detail evaluation. Simulation become carried out to research the strain and displacement distributions throughout effect check. As a result, using specific finite detail technique to are expecting the overall performance of latest merchandise layout is changing using bodily check. Usually, the drop check is carried out via way of means of excessive costly software program wherein dynamic evaluation may be carried out. But, this paper proposes the opportunities of the usage of static evaluation software program.

**Mohammed Imran and Team et al [2014]** had offered paper on Drop Test Simulation on Pen Drive via way of means of the usage of Ansys. In this paper the Drop check evaluation on a pen-pressure with exceptional substances is achieved the usage of ANSYS, to assess the structural protection of aspect, whilst pen-pressure is falling on floor with random velocity. Developing CAD version, meshing and effects are analyzed via way of means of the usage of ANSYS. Dimensions of pen-pressure are taken into consideration with appreciate to business standards. Material homes are decided on as consistent with the ASTM standard (A36). Initially carbon metal is used for the drop check evaluation. Later carbon metal is changed via way of means of kinematic inelastic cloth (Plastic cloth) to discover the structural protection of aspect below drop check boundary conditions. Finally effects are in comparison with each substances value.

**Oguzhan Mulkoglu and Team et al [2015]** had offered a paper on Drop Test Simulation and Verification of a Dishwasher Mechanical Structure. The primary cause of this observe is to construct a finite detail evaluation (FEA) version of the drop check of the free-status dishwasher shape a good way to decide the crucial areas withinside the assembly. Drop check experiments are then carried out and the effects are in comparison with those received from FEA. The FEA version may be used to offer any similarly upgrades on the brand new shape and the packaging module of this new dishwasher platform.

**Y.Y. Wang et al [2005]** had offered paper on Simulation of drop/effect reliability for digital gadgets. In this paper, the finite detail technique (FEM) is used to simulate drop check numerically, even as the eye is paid to the method for studying the reliability of digital gadgets below drop effect. Modelling and simulation technique for such sort of complicated shape is discussed. Some crucial issues, which include manage of the simulation and cloth version, are addressed. Numerical examples are offered to demonstrate the software of FEM on digital product development. Effective modelling and simulation technique are concluded from the numerical instance and authors' enjoy gathered from serial enterprise tasks on drop effect simulations.

**C.Y. Zhou et al [2008]** had offered paper on Drop/effect checks and evaluation of ordinary transportable digital  
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gadgets. This paper provides research at the dynamic conduct of ordinary transportable digital gadgets below drop effect loading. First, an idealized machine which contained an outer case and a Printed Circuit Board (PCB) with an connected packaged chip become followed as specimen. The real effect pressure pulses have been measured via way of means of using a Hopkinson bar in a dynamic check rig. Dynamic lines at sever allocations of the PCB have been concurrently recorded to discover the correlation among the dynamic lines and the effect pressure pulse. Particular interest become paid to the dependence of the dynamic reaction of the PCB at the effect velocity, the pressure pulse, in addition to the effect orientation. A simplified analytical version is proposed to interpret the experimental effects. Technical measures are advised to manual the layout of the applicable gadgets with higher drop/effect protection.

**T. Noguchi et al [2012]** had offered paper on Strength assessment of solid iron grinding balls via way of means of repeated drop checks. In this paper, repeated drop checks have been completed on Ni-difficult and excessive-Cr solid iron grinding balls with cloth sturdiness numerous via way of means of warmness treatment. Instrumented effect checks and bending fatigue checks have been additionally completed on bar specimens with the equal warmness treatment, and correlation among drop power and different power traits have been discussed. In the drop checks from numerous heights, balls fractured via way of means of breakage or spalling, with longer life (Nf) at decrease drop heights (H) giving H–Nf curves just like the S–N curves in fatigue checks. Experiments display that drop power correlated higher with fatigue power and hardness than with effect sturdiness (KId) in each irons. The strain inflicting spalling via way of means of repeated drops become inferred to be repeated touch strain, and inner tensile strain resulting from floor plastic deformation assists the fracture. Breakage from the ball middle is resulting from cyclic tensile radial strain via way of means of effect frame pressure, and is assisted via way of means of residual casting strain.

**K. E. Jackson et al [2005]** had offered paper on Crash Simulation of a Vertical Drop Test of a Commuter-Class Aircraft. In this paper a finite detail version of an ATR42-three hundred commuter- magnificence plane become evolved and a crash simulation become finished. Analytical predictions have been correlated with records received from a 30-ft/s (9.14-m/s) vertical drop check of the plane. The cause of the check become to assess the structural reaction of the plane whilst subjected to a severe, however survivable, effect. The plane become configured with seats, dummies, luggage, and different ballast. The wings have been full of 8,seven-hundred lb. (3,946 kg) of water to symbolize the fuel. The finite detail version, which consisted of 57,643 nodes and 62,979 elements, become evolved from direct measurements of the airframe geometry. The seats, dummies, luggage, simulated engines and fuel, and different ballast have been represented the usage of focused masses. The version become finished in LS-DYNA, a business finite detail code for appearing specific brief dynamic simulations. Analytical predictions of structural deformation and decided on time-records responses have been correlated with experimental records from the drop check to validate the simulation.

**L. Di Palma, et al [2019]** this paper, an upward drop trial of a full composite fuselage part of a territorial airplane has been introduced. This test was performed to explore the underlying reaction of a model of a composite fuselage area as well as the biomechanical reaction of the human fakers under an upward accident stacking condition. The examination movement, did inside the system of Metodi di CERTificazione e Verifica Innovativi ed Avanzati (CERVIA)‡‡ project, permitted gathering appropriate measure of information for the evaluation of the dependability of mathematical models. The test article comprises of a composite fuselage segment with a breadth of 3445 mm and an all out length of 4750 mm. It incorporates all super primary parts, the travelers, and the freight floor structure. Fuselage segment has been likewise outfitted with an aeronautical three-seat line. The speed increases, recorded in various areas, exhibit that the construction can retain an impressive effect energy sum, consequently to alleviate the speed increase levels initiated to the travelers.

**Giulio Scaravaglione et al [2021]** This paper expects to assess the primary strength of unreinforced substantial covering units (CAU), named Cubipod®, utilized on rubble-hill embankments and beach front designs, through a mathematical strategy utilizing the consolidated limited discrete component technique (FDEM). A mathematical demonstrating philosophy is created to repeat the aftereffects of an exploratory assessment distributed by Medina et al. (2011) of a free-fall drop test performed on a 15 t customary Cubic square and a 16 t Cubipod® unit. The field consequences of the Cube drop tests were utilized to align the model. The mathematically reenacted reaction to the

Cubipod® test is then examined with regards to an approval review. The alignment interaction and approval review give experiences into the responsiveness of breakage to rigidity and crash point, as well as a superior comprehension of the pulverizing and breaking harm of this unit under drop test sway conditions.

### III. PROBLEM DEFINITION

In order to achieve better performance and quality, the product design and manufacturing use a number of prototype tests (overload test, fatigue test, and impact test) to insure that the product meets the safety requirements. The test is very time consuming and expensive. Computer simulation of these tests can significantly reduce the time and cost required to perform a new product design. One of the objectives is to optimize the stress during container drop test and to predict the failure modes.

### IV. CONCLUSION

In order to make certain the goods great and reliability, the conventional manner is to perform bodily assessments the usage of prototype. However, it's miles tough to seize the drop phenomenon, mainly the inner reaction, because the effect is of very quick duration. When damage/failure occurs, engineers can most effective examine the reasons primarily based totally at the very last failure and subsequently to enhance the layout.

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