

高等研究所 第 64 回 月例研究会 (WIAS 64th Monthly Workshop)

【日 時】5 月 16 (金) 11 : 00~12 : 30

【会 場】9 号館 5 階 第一会議室

【発表者】細井 厚志 理工学術院 講師、

中條 美和 助教

1. 細井 厚志 講師 / 理工学術院 (Atsushi HOSOI) : 11 : 00~11 : 40

「材料の破壊と治癒」



今日まで科学技術が発展してきたにも関わらず、鉄道の脱線事故やトンネルの崩落事故のように、機械や構造物の破壊事故は無くならない。それは、実働環境下では、設計時に想定できない外的要因が加えられたり、非常に複雑な破壊現象が進行するからである。新しい材料が開発されるとともに、そのような複雑な破壊現象が、「なぜ」、「どのように」生じるのかを明らかにし、簡便なモデルに置き換えて、「いつ」、「どこで」破壊が生じるかを予測する試みが長年研究されている。最近では、ナノメートル（髪の毛の直径の 1 万分の 1）のオーダーで破壊現象を評価できるようになり、これまで分らなかった新たな破壊現象が解明され始めている。一方、き裂が生じた構造物で、ヒトが骨折を治癒するように、き裂を治癒させて元の状態に戻すことができれば構造物を長く安全に利用することができる。本発表では、最新の航空機材料の破壊現象の評価と金属材料のき裂治癒技術について紹介する。

Fracture and healing of materials

Failure accidents of a machine or a structure, such as derailment of a train and collapse of a tunnel, are repeated although technology has developed to date. That is because external factors that cannot be assumed at the time of design are added and a very complicated fracture propagates under the serviced environment. While a new material is developed, the studies to clear that "how" and "why" such a complicated fracture phenomenon happened and to predict that "when" and "where" fracture will occur have been conducted for a long time. In recent years, fracture phenomenon can be evaluated on the order of a nanometer scale, 1/10000 of the diameter of a hair, and the new fracture phenomenon which was not found is beginning to be cleared. On the other hand, if a crack in a structure can be healed as human heals broken bone, we can use a machine or a structure safely for a long term. In this presentation, evaluation of the fracture phenomenon of the latest airplane material and a technique of crack healing of metals are introduced.

2、中條 美和 助教 (Miwa NAKAJO) : 11 : 50~12 : 30

「Dynamic Relationships Between Trust in National and Local Government and Civic Engagement」



This paper aims to explain the dynamic relationships between trust in national and local

governments focusing on the effect of civic engagement. The previous literature suggests that each level of trust in government is shaped differently but is related to each other.

Additionally, civic engagement is supposed to affect each level of government though the extent of the effect is different between trust in national and local government. Using multiple time-series analyses, I examine these reciprocal relationships between these three variables. The findings are (1) the movement of civic engagement drives those of local political trust but responds to that of national political trust and (2) the movements of trust in national and local governments are reciprocal. Uncovering these relationships gives a clue to understanding how the hierarchical structure of democratic society forms stability.